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COMMERCIAL FISHERIES REVIEW

Vol. 17, No. 8 AUGUST 1955

FISH and WILDLIFE SERVICE
United States Department of the Interior
Washington, D.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

FISH AND WILDLIFE SERVICE
JOHN L. FARLEY, DIRECTOR

COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor
J. Pileggi and J. J. O'Brien, Assistant Editors

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, November 5, 1952.

CONTENTS

COVER: Boxes of domestic and Canadian iced fresh-water fish stacked up in the shipping room of a wholesale fish firm located in the Fulton Market area of Chicago. In 1954 Chicago wholesale fish dealers received 117 million pounds of fresh and frozen fish and shellfish, consisting of 54 million pounds of fresh-water fish, 35 million pounds of salt-water fish, and 28 million pounds of shellfish, etc.

Page
Reduction of Curd in Canned Salmon Prepared from Frozen Fish, Part I - Use of Tartaric-Acid and Sodium-Chloride Brine Dips, by John A. Dassow and Howard J. Craven 1
Winter Smelt Fishing out of Escanaba, Michigan, by A. A. Swanson 6

Page
RESEARCH IN SERVICE LABORATORIES: 9
  Federal Specifications for Fishery Products, by F. T. Piskur 9
  Chemical Changes in Fish Protein During Freezing and Storage 10
  Unidentified Growth Factors in Fish Byproducts, by William N. Sumerwell 11
  Fish Oil and Meal Samples Collected for Evaluation 14
TRENDS AND DEVELOPMENTS: 15
  Additions to the U. S. Fleet of Fishing Vessels . . 15
  American Samoa:
    Tuna Cannery Contracts with Japanese Fishing Company 15
  California:
    Tuna Tagged by Clipper *Virginia R.* (Cruise C-55-1) 16
    Yellowtail Tagged and Pacific Mackerel Specimens Collected off Baja California by *Yellowfin* (Cruise 55-Y-3) 16
    Record Planting of Japanese Seed Oysters 17
    Shrimp Production, May 1955 18
  Cans--Shipments for Fishery Products, January-April 1955 18
  Federal Purchases of Fishery Products 18
  Fishery Products Marketing Prospects, July-Sept. 1955:
    Outlook 19
    Marketing Situation at Mid-Year 20
  Gulf Exploratory Fishery Program:
    Oregon Catches Large Yellowfin Tuna in Gulf (Cruise 31) 21
  Maine:
    Sardine Industry Launches Summer-Fall Promotion 22
  Maryland:
    Whereabouts of Blue Crabs in Chesapeake Bay During Spring 22
    Over 2 Million Oyster Shells to be Planted 23

Page
TRENDS AND DEVELOPMENTS (Contd.):
  Michigan:
    Sea Lamprey Control Work Increased 23
  North Atlantic Fisheries Exploration and Gear Research:
    Northern Shrimp Caught in Commercial Quantities off Nova Scotia by *Delaware* (Cruise 6) . . 24
    Commercial Quantities of Ocean Perch and Whiting Taken by *Delaware* in Deep Water (Cruise 7) 24
  North Atlantic Fisheries Investigations:
    Haddock Eggs and Larvae Studies Continued by *Albatross III* (Cruise 61) 25
  North Atlantic Herring Research:
    Joint U. S. -Canadian Investigation of Herring Resources Launched by *T. N. Gill* (Cruise 1) and *Harengus* 25
    Small Herring Schools Located in Inside Waters Bordering Gulf of Maine by *Theodore N. Gill* (Cruise 2) 27
  North Pacific Exploratory Fishery Program:
    John N. Cobb to Search for Salmon in Offshore Waters of North Pacific 27
  Oceanic Research Unit Set up by Service in California 28
  Saltonstall-Kennedy Act Fisheries Projects:
    Service Completes Commitment of First Year's Funds 29
    Service to Survey Fishing Vessel Insurance Problems 32
    Shrimp Merchandising Practices Studied by Service 32
    Service Opens Two New Fishery Statistical Offices 33
  Status of Long Island Oysters 34
  U. S. Foreign Trade:
    Edible Fishery Products, April 1955 34
  Wholesale Prices, June 1955 35

Contents Continued Page 79

COMMERCIAL FISHERIES REVIEW

August 1955 Washington 25, D.C. Vol. 17, No. 8

REDUCTION OF CURD IN CANNED SALMON PREPARED FROM FROZEN FISH

Part I - Use of Tartaric - Acid and Sodium - Chloride Brine Dips

By John A. Dassow* and Howard J. Craven**

ABSTRACT

Large amounts of proteinaceous curd frequently form on the surface of the canned product prepared from frozen salmon.

Dipping thawed red-salmon and coho-salmon steaks for 1 minute in a 5-percent solution of tartaric acid before canning effectively reduced curd formation. Visual examination indicated that the surface protein was coagulated by the action of the tartaric-acid solution. This tartaric-acid treatment tended to prevent the fading of color in red salmon during canning but slightly altered the shade of color to an orange-red. This slight color change was not objectionable. Steaks treated with the tartaric-acid solution did not stick to the can after processing as did untreated steaks or brined steaks.

Brining thawed salmon steaks before canning resulted in some reduction in curd formation but was not as effective as was the tartaric-acid dipping.

INTRODUCTION

During the past several years, the number of freezerships operating in Alaskan waters has increased considerably. Salmon frozen on these ships are deliver-

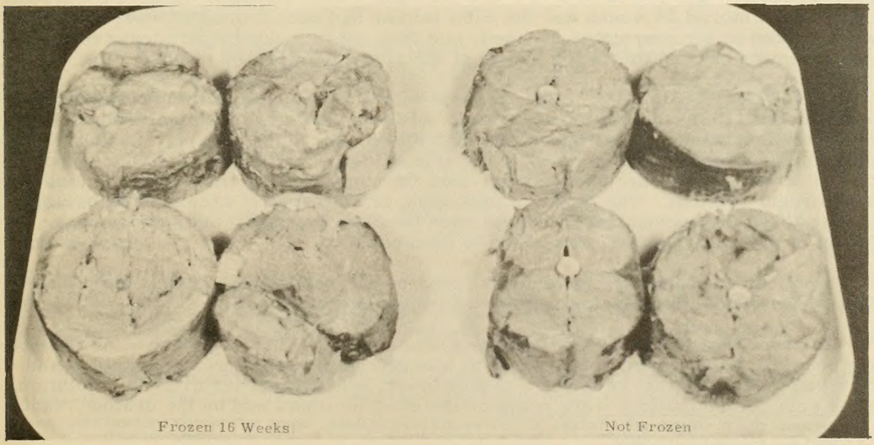

Fig. 1 - Canned red salmon--control and 16-week frozen product compared for curd in can.

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ed usually to Puget Sound ports, where they are thawed and canned. Stansby and Dassow (1951) found that freezing, storing, and later thawing and canning salmon resulted in a product of inferior quality as compared with canned salmon prepared from fresh fish. One of the objectionable differences was the frequent presence of large quantities of proteinaceous curd on the surface of the canned salmon (fig. 1). The curd deposit, being almost white in color, was most noticeable on the highly colored red salmon (Oncorhynchus nerka), which is the predominant species being frozen on the freezerships.

The formation of curd in canned salmon is not unique to the product prepared from frozen fish. Denstedt and Bailey (1934) discussed methods of preventing curd formation in canned fresh salmon. Tanikawa, Inoue, Akiba, and Numakura (1952) studied the formation of curd in canned frozen mackerel.

Denstedt and Bailey chemically coagulated the surface protein of the salmon by immersing the uncooked salmon for 10 minutes in 70-percent saturated sodium-chloride brine[1] or in dilute acetic acid or citric acid solutions. They suggested that the coagulated surface protein formed a seal holding the dissolved protein within the meat until the heat of processing could coagulate it and make it immobile. Tarr (1942) showed that sodium chloride prevents drip in lightly-brined fish by causing the proteins to swell and to bind liquid firmly. Carter (1938) reported that dipping the raw meat of salmon in a weak solution of tartaric acid prior to canning gave the best protection against curd formation.

OBJECTIVE OF EXPERIMENTS

The objective of the present experiments was to determine the extent of curd reduction obtained by the use (1) of tartaric-acid dips and (2) of brine dips for pretreatment of thawed salmon steaks prior to canning.

EXPERIMENTAL

SAMPLES: Red salmon (Oncorhynchus nerka) and coho salmon (Oncorhynchus kisutch) were obtained from a local cannery approximately 18 hours after the fish were removed from a trap. The fish were frozen in the round at -20° F. in air, glazed heavily, and stored at 0° F. in a laboratory cold storage. After the red salmon had been stored 14 weeks and the coho salmon had been stored 28 weeks, the fish were thawed in air overnight, dressed, and then cut into can-height steaks for tests on prevention of curd formation by use of tartaric acid dips and of brine dips.

TARTARIC ACID DIPS: In accordance with the recommendations of Sunderland and Parsons (1937), a solution of tartaric acid was used as a chemical coagulant. Since modern cannery lines operate at high speed, dip times of $\frac{1}{4}$, $\frac{1}{2}$, 1, and 2 minutes in a 5-percent solution (w/w) of tartaric acid and 1 minute in a 2-percent solution of tartaric acid were used, rather than the suggested dip time of 10 minutes in a 3-percent solution. The dipped steaks were drained free of excess solution before being packed in $\frac{1}{2}$-pound flat C-enamel cans (seafood formula), and the normal amount of dry salt ($\frac{1}{8}$ ounce) was added to each can.

Application of the tartaric acid by spraying a 5-percent solution on the top surface of the steak after placing it in the can was also tried.

In order that the amount of free tartaric acid remaining in the can after processing could be ascertained, total free acid was determined on untreated samples and on treated samples that received a 1-minute dip in 5-percent tartaric-acid solution. Free acid determinations were made on the oil-free liquid and on the drained meat separately. Free tartaric acid was calculated from the difference in total acidity between the treated and untreated samples. The pH of the liquid was measured with a glass electrode.

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[1] A saturated sodium-chloride brine contains 26.5 percent salt (w/w) at 60° F. Hence, a 70-percent saturated brine contains 18.5 percent salt by weight.

BRINE DIPS: Dips of 10 minutes in a 70-percent saturated brine and of ¼, ½, 1, and 2 minutes in a saturated brine were given thawed steaks in tests to reduce curd formation by brining. The steaks were then packed in ½-pound flat C-enamel cans. Dry salt (⅛ ounce per ½-pound can) was added only to those samples dipped 1 minute or less.

CONTROL SAMPLES: Control samples were packed in ½-pound flat C-enamel cans. The normal amount of dry salt (⅛ ounce per ½-pound can) was added to each can.

CANNING AND STORING: Cans were seamed at a vacuum of 18 to 20 inches, processed for 85 minutes at 242° F., and cooled in air. The samples were then stored at room temperature for 3 to 4 weeks before examination.

RESULTS

TARTARIC-ACID DIPS: After the thawed salmon steaks had been dipped for 1 minute in 5-percent tartaric acid solutions, the surface protein appeared to be completely coagulated--as if the steaks had been cooked.

The pretreatment of the salmon with tartaric-acid solutions prior to heat processing gave a marked reduction of curd in all tests. The 1- and 2-minute dips in 5-percent tartaric-acid solution were equally effective, and only very slight curd formation was evident. Dips of less than 1 minute in 5-percent tartaric-acid solution were progressively less effective. The 1-minute dip in 2-percent tartaric-acid solution was not nearly as effective as was the 1-minute dip in 5-percent tartaric-acid solution.

The normal bright red color of red salmon fades slightly during the canning process. The tartaric-acid treatment tended to prevent fading but altered the color slightly to an orange-red shade. This slight color change was not considered objectionable and would probably not have been noticed if untreated samples had not been used for comparison.

Table 1 - The pH and Free Tartaric Acid Content of Treated and Untreated Canned Salmon

Treatment of Salmon Prior to Canning	pH of Liquid1/	Free Tartaric Acid in Liquid1/	Free Tartaric Acid in Meat1/	Free Tartaric Acid in Total Contents2/
		. . . .	(Percent)	. . . .
Steaks dipped 1 minute in 5-percent tartaric acid solution	6.0	0.07	0.02	0.03
Steaks left untreated	6.3	0	0	0

1/ Values were averages of results from six ½-pound flat cans analyzed individually.
2/ Values were based on drained weight of 195 grams of meat and 35 grams of liquid and oil per ½-pound flat can.

Taste-panel members could not distinguish any difference in flavor between untreated samples and samples given a 1-minute dip in a 5-percent solution of the tartaric acid.

Results of analyses made on canned salmon that received a 1-minute dip in a 5-percent solution of tartaric acid and on untreated canned salmon showed a total free tartaric-acid content of 0.03 percent in the cans of the salmon receiving the dip. The presence of the tartaric acid lowered the pH from 6.3 to 6.0. Complete data are given in table 1.

An unexpected result of the dipping tests was that the tartaric-acid dip eliminated any sticking of the salmon to the cans.

Spraying the top surface of the steak with tartaric acid after the steak had been placed in the can gave some reduction in curd but was not as effective as was dipping. The spray method of applying the acid could probably be adapted for use with existing cannery lines and--with additional work--could likely be improved in effectiveness.

BRINE DIPS: Brining thawed steaks before placing them in the cans resulted in a significant reduction in curd formation. In the studies using saturated brine, the amount of curd reduction increased with the increasing duration of the dips. Of the brine treatments used, the 70-percent saturated brine and 10-minute dip gave the greatest reduction in curd.

COMPARISON OF DIPS: Although the 10-minute dip in 70-percent saturated brine produced a significant reduction in curd, it was less effective than was the 1-minute dip in 5-percent tartaric-acid solution. Shorter times with the saturated brine dips were much less efficient in reducing curd than were any of the tartaric acid dips.

Inspection of the canned salmon prepared from the frozen fish showed that samples treated with tartaric acid never adhered to any of the cans. On the other hand, both the untreated and brined samples showed excessive sticking of the meat to the can, resulting in pieces of meat being torn from the surface when the lid was removed. Brined samples were somewhat better in this respect than were the untreated lots but were definitely inferior to the tartaric acid-dipped salmon. Thus, the tartaric-acid treatment was not only the most effective for the reduction of curd formation in canned frozen salmon, but it also eliminated sticking of the meat to the can.

DISCUSSION

For commercial application, the 1-minute dip in 5-percent tartaric-acid solution appears to be the simplest and most effective treatment for the reduction of curd. The slight color change taking place in the acid-treated canned salmon should not be objectionable. To comply with U. S. Food and Drug regulations, however, a packer would have to state on the label that tartaric acid had been added. Enamelled cans should be used with the tartaric acid treatment to eliminate corrosion due to tartaric acid carried over to the inner surface of the can in high-speed processing.

The use of the 10-minute dip in 70-percent brine provides some correction of the excessive curd formation but would appear impractical commercially because of the long dipping time required.

Since a dipping procedure involves considerable modification of the cannery line, further study should be made--under commercial conditions--of the treatment of the salmon after filling the can.

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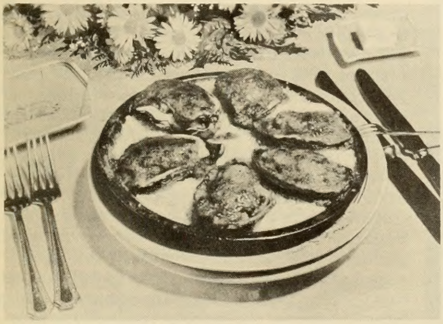
* * *

SEPTEMBER HERALDS NEW OYSTER SEASON

"Oysters R in season" has been added to "readin', writin', and 'rithmetic" to form the four R's of September, as the oyster season joins the "back to school" movement during the month of the equinox.

Oystermen can be seen these days in the bays and estuaries along the Pacific, Gulf, and Atlantic coasts--as far north as Cape Cod--busily dredging and tonging for these highly popular shellfish and preparing them for shipment to countless points throughout the Nation.



Oysters a la Rockefeller

According to reports received by the Department of the Interior's Fish and Wildlife Service, an average crop of oysters is expected this year. This means a fairly good supply throughout the season, which generally extends from September through April.

Raw oysters can be purchased in or out of the shell. Oyster meats are further processed and sold raw frozen, raw or cooked breaded, or canned. Regardless of the form, oysters have special appeal to the busy homemaker because they are easily prepared, entirely edible, and easy to serve. They can be served raw on the half-shell or in a cocktail, or cooked in a variety of ways such as baked, broiled, fried, or in combination dishes like stews, soups, chowders, and shore dinners. To retain the delicate distinctive flavor of oysters, never cook them too long--just enough to heat them thoroughly and still leave them plump and tender.

Either Eastern or Pacific oysters may be used in the following recipe for "Oysters Remick," developed and tested recently by the home economists of the U. S. Fish and Wildlife Service:

OYSTERS REMICK

36 shell oysters 1/
2 cups mayonnaise
¼ cup chili sauce
¼ teaspoon paprika
6 drops tabasco sauce
1 tablespoon prepared mustard
4 slices bacon
½ teaspoon salt
Dash pepper
2 teaspoons lemon juice
2 tablespoons butter or other fat, melted
½ cup dry bread crumbs

1/ If shell oysters are not available, 1½ pints select oysters may be used. Drain oysters and arrange on a shallow, well-greased baking dish. Spread with seasonings and cook as above.

Shuck and drain oysters; place on deep half of shells. Combine mayonnaise and seasonings. Spread over oysters. Combine butter and crumbs and sprinkle over top of each oyster. Cut each slice of bacon into 9 pieces and place a piece on top of each oyster. Place on a preheated broiler pan about 3 inches from the source of heat. Broil for 5 minutes or until edges begin to curl. Serves 6.

WINTER SMELT FISHING OUT OF ESCANABA, MICHIGAN

By A. A. Swanson*

BACKGROUND

Escanaba, Mich., is located on Little Bay de Noc which extends north out of Green Bay. Little Bay de Noc is frozen over in the winter, permitting pound-net fishing through the ice. The rest of Green Bay is, to a large extent, open water or subject to breakups which can be very disastrous where nets are used. It is for this reason that the first smelt of the season to reach many of the midwest markets are "Escanaba Smelt" from the waters of Little Bay de Noc. During this early period of production there is practically no competition from other sources and demand is usually brisk and prices good. In 1955 nets were set and the season began on January 25. The season can extend until the ice breakers come in to open the port of Escanaba to commercial shipping in the middle of April.

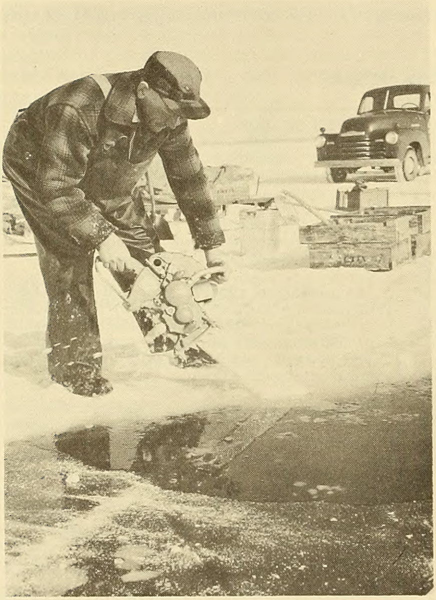


Fig. 1 - A smelt fisherman near Escanaba, Mich., on Little Bay de Noc using a chain saw to make an opening in the ice through which to draw the pound net.

A fishing company which gets a big share of the commercial smelt catch stated in February 1955 that smelt fishing was good but would be termed only fair when compared with what it was in the bumper years before the smelt staged a fadeout about a decade ago. During 1942-43 all but a comparatively few of the smelt in the Great Lakes perished. It was predicted. at that time by the fishing interests of the area that Escanaba's status as the "Smelt Capital" was over. However, the smelt began to come back. The return was gradual and for a time there wasn't enough to supply the market. But that is not the case now. The catch at this time is practically back to almost the productivity of former years. In February 1955 the fishermen of Little Bay de Noc found a good market for their catches with jumbo bringing 12-14 cents ex-vessel and regular smelt averaging 5 cents a pound.

GEAR USED TO FISH SMELT

The pound nets in Little Bay de Noc number into the hundreds and are located for miles along its shores. Delta County has about 200 licensed fishermen who employ 500 extra men--and all depend to a certain degree on smelt for a considerable portion of their livelihood. The nets used in this winter fishery average about 40 by 40 feet at the sides and are 80 feet deep. The size of the mesh is $1\frac{1}{8}$ inches. A floor of the same material is at the net's bottom. A larger-meshed wing or lead is set to run from the funnel to shallower water, about 30 feet deep--or toward a bank or shoreward. Thus the operations are mostly close to shore. To sink the pound, a large hole of practically the same dimensions as that of the net has to be spudded out. In operation the net is drawn daily through a daily-renewed opening in the ice about two-feet wide and running the width of the net. This hole in the ice through which the net is drawn and the catch removed (fig. 2 and fig. 3) is usually chopped out manually, but some fishermen are now using chain saws for this purpose (fig. 1).

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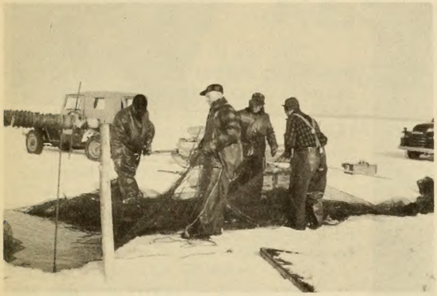

Fig. 2 - Lifting a pound net through an opening in the ice of Little Bay de Noc.

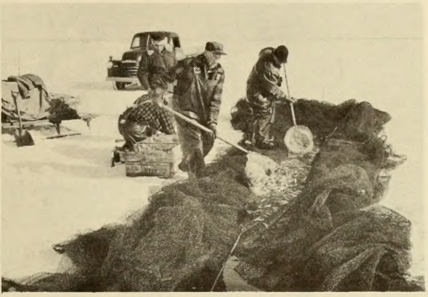

Fig. 3 - Dipping catch of smelt from pound net.

SMELT NOW USED MORE EXTENSIVELY

In the earlier years of this fishery when the market became oversupplied (and that was very shortly after the smelt run was little more than started), much of the catch went to waste. Commercial fishermen are still confronted with a limited market, but due to vastly improved facilities for processing perishable foods and to broader channels of consumption, the waste has been reduced. Use as feed for mink has taken care of many tons of surplus smelt and their conversion into canned food for cats has also served a good purpose. But purchases for these purposes occur only when the market is oversupplied and regular market sales few.

Freezing and processing of smelt for human consumption has increased during the last few years. There are several processing plants in the Escanaba area that are packaging and freezing smelt for the grocery trade. In some instances they are dressed, in others they are also breaded and seasoned ready for the pan (fig. 4 and fig. 5).

NETS LOST IN MENOMINEE COUNTY

It was noted earlier that Little Bay de Noc winter fishermen had an advantage because of the solid freezeover, while the rest of Green Bay is open water or subject to ice breakups. To emphasize this, it can be point-out that on February 21, 1955, Menominee County bayshore commercial fishermen lost 18 to 20 pound nets when Green Bay ice moved out, due to brisk southwesterly winds in the Cedar River area from Kleinke Park to the mouth of the Bark River. Menominee County lies directly south of Delta County (and Escanaba). Most of the

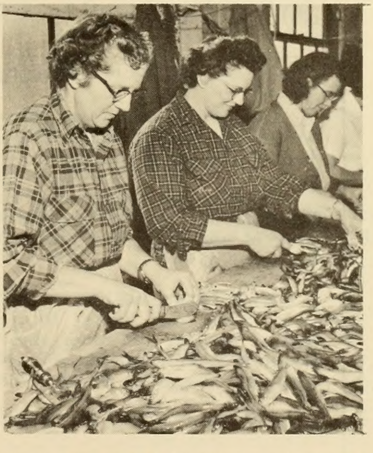

Fig. 4 - Dressing smelt for packaging and freezing in a plant in Escanaba, Mich.

pound nets are weighted and attached with cord so that they drop to the bottom in the event the ice moves. Fishermen attempt to recover the nets by going out in in boats and searching with grapple hooks.

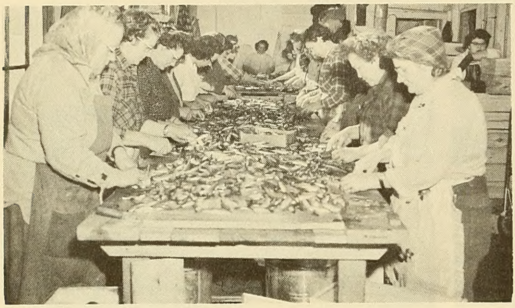

Fig. 5 - Dressing smelt in a plant in Escanaba, Mich.

The ice in Green Bay usually breaks up in four stages. The first stage is usually in the Cedar River area, the second as far south as Ingallston about 10 miles north of Menominee, and the third along the channel of the Ann Arbor car ferry between Menominee and Sturgeon Bay. The southern section of the Bay is usually the last to go.

Only once in the last 55 years has the ice gone out completely in February. That was in 1944 when the ice went out on February 15. That year the bay didn't freeze until late in January. It didn't freeze until late this year and when it did a sudden cold wave made the ice brittle. Fishermen had predicted it wouldn't last too long.

* * *

WAFER-THIN OYSTERS

Oysters as thin as wafers were grown last winter in Tedious Creek, Dorchester County, Md. The novel specimens grew by accident rather than by design on the bottom of a boat stationed in the area.

"The bottom was literally covered with oysters about two inches in diameter and thin as a wrist watch," said the skipper. "The amazing thing is that they grew that size since last June--right over a new coat of copper paint."

Oysters normally require about two years to reach two inches in size. They also prefer to attach themselves to cultch such as oyster shells, stones, or some other hard surface lying on the bottom. Although frequent reports of small oysters growing on boat bottoms are received, the wafer shape is novel.

--The Compass, July 1955,
Department of Tidewater Fisheries,
Annapolis, Md.

RESEARCH

IN SERVICE LABORATORIES

FEDERAL SPECIFICATIONS FOR FISHERY PRODUCTS

The Service's Technological Section is responsible, as a service to other Federal agencies, for the development of Federal specifications for fishery food products. This assignment includes responsibility for (1) development of the specification and coordination with Federal agencies and with industry and (2) amendment, revision, and further development as found to be necessary. This work is now coordinated at the Fishery Technological Laboratory, East Boston, Mass., as part of the program on the development for fishery products of standards for quality. The other Service laboratories in College Park, Md., Seattle, Wash., and Ketchikan, Alaska, cooperate in the work by developing the requirements for the particular products common to their areas and by reviewing the individual specifications.

By definition, a specification is an accurate description of the technical requirements for a material, a product, or service, including the procedure by which it will be determined that the requirements have been met. Specifications are prepared as needed to meet the requirements of Federal agencies for the purchase of fishery food items.

The following specifications have been revised during the past several years:

PP-0-956, Oysters, raw, shucked (fresh or frozen), Issued July 27, 1950.

PP-C-401, Clams, raw, shucked; fresh (chilled) and frozen, Issued April 25, 1952.

PP-F-381, Fish; fresh (chilled) and frozen, Issued Sept. 3, 1954.

PP-S-31, Salmon, canned, Issued February 3, 1954.

The following specifications have been revised and issued as Interim specifications (coordination with other Federal agencies and with industry has been completed and they will soon be issued as Federal specifications):

PP-S-00311a, Shrimp, Canned, Interim specification issued November 18, 1954.

PP-S-00316a, Shrimp, raw and cooked, chilled and frozen, Interim specification issued November 18, 1954.

PP-C-00656a, Crab Meat, cooked; chilled and frozen, Interim specification issued May 2, 1955.

The following specifications have been revised and are out for review by the industry:

PP-C-651, (Revision "a") Crab Meat; Canned, Revised June 9, 1955.

PP-S-51, Sardines, Canned (Revised July 1955 for preliminary industry review and coordination with other Federal agencies).

The following specifications have been cancelled:

PP-F-371, Fish; Flaked, Canned, March 31, 1931.

PP-F-401, Fish; Salted or Smoked, March 31, 1931.

The following specification is being revised:

PP-0-951, Oysters, Canned, Issued March 3, 1931.

No action has been taken on the specification for Tuna Fish, Canned, PP-T-771, March 31, 1931, pending development of standards of identity and fill by the Department of Health, Education, and Welfare.

(Single copies of Federal fishery specifications and other product specifications required by activities outside the Federal government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.)

--F. T. Piskur, Fishery Products Technologist,
Fishery Technological Laboratory,
Branch of Commercial Fisheries,
East Boston, Mass.

CHEMICAL CHANGES IN FISH PROTEIN DURING FREEZING AND STORAGE

One of the factors limiting the sale of frozen fishery products is the tendency for fish and shellfish to become tough during frozen storage. Although this problem has been recognized for many years, progress toward its solution has been slow. One reason for this delay has been the lack of a basic understanding of the causes of toughening. The Fishery Products Laboratory at Ketchikan has therefore undertaken a fundamental study of this problem.

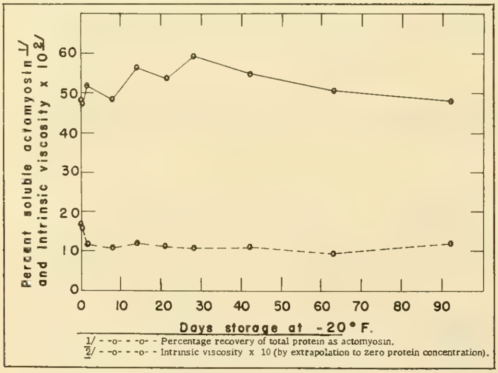

Fig. 1 - Viscosity and solubility properties of actomyosin isolated from frozen-thawed yellow-striped rockfish.

There is evidence to indicate that toughening is related to structural changes in the fish protein. Since such changes would probably alter the shape or size of the protein molecules, a clue to the extent of these changes is the absolute viscosity of a solution of the thawed protein. A study of the viscosity of protein solutions is thus the current phase of investigations at the Ketchikan Laboratory.

A method has been developed whereby the protein fraction called actomyosin is isolated from fish muscle and subjected to viscosity measurement, yielding a value which is a function of the asymmetry of the protein molecule. Yellow-striped rockfish (Sebastodes nebulosus) meat that was held in frozen storage (-20° F.) up to 92 days was subjected to evaluation by this method at intervals during this storage period. An estimation of residual soluble actomyosin in dilute salt solution was also carried out at these same intervals for comparative purposes. The results of these tests are briefly presented in figure 1.

The soluble actomyosin values increased toward a maximum value after about one month's storage. They subsequently declined to approximately the initial value. A sharp drop in viscosity occurred within $1\frac{1}{2}$ days of storage; thereafter the viscosity values remained quite constant. Other isolated experiments indicate, however, a significant decrease in viscosity and solubility resulting from either long storage periods (approximately one year) at relatively low temperature (-20° F.) or short storage periods (approximately two months) at relatively high temperature (10° F.). Apparently the change of state of the actomyosin follows a time-temperature relationship, at least as indicated by the results of these viscosity and solubility measurements.

Using refined isolation and viscosity techniques, it is planned to continue this study on the rate and extent of "freeze-denaturation" of actomyosin in fish muscle. The effect of the freezing process itself and the "time-temperature" factor will be more closely studied.

The changes in the protein of a species of fish known to be quite resistant to toughening in frozen storage will be compared to those of a species very susceptible to these undesirable changes. If it can be demonstrated that the solubility and viscosity changes of the protein fraction actomyosin correlate closely with texture changes in the frozen stored fish meat, a useful tool will have been found for improvement in freezing and frozen storage procedures. The effects of the initial condition of the raw material and of processing techniques such as the rate, temperature, and time of freezing, and the temperature and time of frozen storage could then be measured objectively and at each stage.

UNIDENTIFIED GROWTH FACTORS IN FISH BYPRODUCTS

SUMMARY

Concentrated fractions of the growth factor(s) in tuna livers, salmon eggs, and menhaden meals were prepared by solvent extraction, dialysis, and final purification--either by 12-stage countercurrent distribution or by passage through ion-exchange resins. The maximum growth response produced by the various fractions were measured by means of a microbiological assay in which L. casei was used.

A 35- to 45-percent maximum growth response was obtained when the crude fraction prepared by extraction and dialysis was assayed. All the raw materials--tuna livers, salmon eggs, and menhaden meals--gave about the same maximum growth response.

The fraction adsorbed on the anion-exchange resin produced a significant growth response, but there was no adsorption of growth factors on the cation column.

Efforts to prepare fish-byproduct fractions that will yield greater information as to the number of growth factors present or as to the number of modifications in chemical structure of the growth factor(s) are now in progress.

BACKGROUND

Studies on unidentified growth factor(s) in fish byproducts have been in progress at the Service's Seattle Technological Laboratory since July 1951. This work has had two main objectives: (1) to establish a chemical fractionation procedure by which the growth factor(s) could be concentrated, and (2) to develop a microbiological assay that could take the place of the expensive and time-consuming animal assays.

Concurrent with the work in Seattle, a study has been under way in the Service's College Park Laboratory on the animal assay of the unidentified growth factor(s). Since this study has included assays on the fractions resulting from the chemical procedures at Seattle, it will show whether correlation exists between the results obtained by the microbiological and the animal assays. These findings will be described subsequently in a separate report.

CHEMICAL FRACTIONATION PROCEDURES

In the fractionation work, three types of raw material have been used: tuna livers, salmon eggs, and--to a lesser extent--menhaden meals. The procedures that have been used to concentrate the growth factors in these raw materials are similar to those used by Menge, Denton, Sizemore, Lillie, and Bird (1953) to fractionate fish solubles and by Menge and Combs (1952) to fractionate liver extracts.

EXTRACTION OF THE GROWTH FACTOR(S): In the fractionation of tuna livers and salmon eggs, a sample of approximately 25 pounds was ground to a homogeneous slurry. Ninety-five percent ethanol was than stirred in at a ratio of 1 gallon of ethanol to 5 pounds of sample. The resulting mixture was allowed to stand, with occasional stirring, in a cold room at 34° F. for 24 hours. The alcoholic solution was then removed from the precipitated tissue protein by means of a basket centrifuge, and the residue of protein was given one extraction with 80-percent ethanol, at a ration of about 2 liters of ethanol to 1 pound of residue. Finally, the two alcoholic extracts were combined and then concentrated, under reduced pressure, to about $\frac{1}{10}$ the original volume. The resulting crude concentrate was called fraction I.

REMOVAL OF LIQUID MATERIAL AND DIALYSIS: Fraction I was extracted repeatedly with chloroform to remove lipid material. The aqueous concentrate remaining after chloroform extraction was then further concentrated to approximately 1 liter. This concentrate was transferred to a cellophane dialysis tube ($3\frac{1}{2}$-inches in diameter) and was dialyzed against distilled water at 34° F. for 3 weeks, with a change of dialysate water every third day. The collected dialysates were finally concentrated to approximately 500 milliliters. This final concentrate was called fraction II.

Glacial acetic acid was now added to the concentrated dialysate (fraction II) to make a 2-percent ($^{v}/v$) acetic acid solution. This solution was extracted three times with 300-milliliter volumes of either para cresol or water-saturated phenol. (The growth factor went into the phenolic layer.) The para cresol or phenol extracts were combined and then diluted with 5 volumes of acetone, and this mixture was stored overnight at 34° F. The brown amorphous precipitate that formed was collected in 250-milliliter bottles by centrifugation. Finally, the precipitate was washed in the bottles--first with acetone and second with ether--and was then dried in a vacuum oven for 8 hours at 50° C. The resulting concentrate was called fraction III. This concentrate (fraction III) was then divided into two parts, the one being called fraction IIIA and the other, fraction IIIB.

PURIFICATION BY COUNTERCURRENT DISTRIBUTION: Fraction IIIA was purified by countercurrent distribution (CCD) in a two-phase system, comprising a phenolic phase and a water phase. The phenolic phase was made up of 70 percent phenol and 30 percent secondary butyl alcohol ($^{w}/w$). The water phase was a solution of 3-percent acetic acid ($^{v}/v$) adjusted to pH 2.0 with hydrochloric acid.

The distribution was carried out in twelve 1-liter separatory funnels numbered from 0 to 11. One gram of sample was dissolved in 350 milliliters of the aqueous layer in the initial stage of the distribution. Each of 12 fractions (2 phases present) obtained by counter-current distribution was transferred to a 3-liter separatory funnel, and 1 liter of ether was added to extract phenol and secondary butyl alcohol (the growth factor went into the aqueous phase). The 12 aqueous phases remaining after each of the ether layers was removed were each concentrated under reduced pressure to a volume of approximately 15 to 25 milliliters. Each concentrated phase was then diluted with 5 volumes of acetone and stored overnight at 0° F. The precipitates that formed were each collected in small centrifuge tubes and were washed first with acetone and second with ether. Finally, the precipitates were dried in a vacuum desiccator over silica gel.

These dried precipitates were numbered 0 to 11, according to the separatory funnel from which each was obtained (CCD fractions 0 to 11).

PURIFICATION BY ION-EXCHANGE: Fraction IIIB was purified by passing weighed samples, dissolved in water, through an anion-exchange resin (Amberlite IRA--400) and a cation-exchange resin (Amberlite IR-120). The material absorbed on the anion column was removed by washing with 5-percent sodium bicarbonate adjusted to pH 8.5, whereas the material absorbed on the cation column was removed by washing with 3-percent acetic acid adjusted to pH 2.0. This treatment gave fractions A-A (adsorbed) and A-U (unadsorbed), from the anion column, and fractions C-A (adsorbed) and C-U (unadsorbed), from the cation column.

EXTRACTION OF MENHADEN MEALS: The menhaden meal was extracted as follows:

A mixture was formed by the addition of 3-percent acetic acid to the dry meal at a ratio of 2 liters of acid solution to 1 kilogram of meal. This mixture was autoclaved at a pressure of 15 pounds and was then allowed to cool to room temperature. Finally, the supernatant liquid was decanted and filtered.

The remaining solid material was extracted two more times, with the same procedure being used as with the dry meal, and was then discarded.

The resulting three aqueous extracts were combined and then concentrated under reduced pressure. The concentrate thus formed was diluted with 95-percent ethanol to the lower concentration of 80-percent ethanol. Finally, the alcohol-soluble portion was filtered off.

The procedure from there on was the same as with the tuna livers and salmon eggs.

MICROBIOLOGICAL ASSAY

A convenient synthetic medium for lactic acid bacteria was described by Flynn, Williams, O'Dell, and Hogan (1951). By the use of this medium, it was found that the addition of fraction I consistently produced a 40- to 45-percent growth increase with L. casei (ATCC - 7469), as measured by the increase in acid produced in comparison with controls containing no added fraction. Since the growth response obtained with fraction I was good, it was decided to determine the L. casei growth response produced by the other fractions.

It was found that fractions II and III produced a maximum growth response of 35 to 45 percent, indicating little or no loss of growth-factor(s) as a result of the concentration procedures used.

All the raw materials--tuna livers, salmon eggs, and menhaden meals--gave about the same maximum growth response.

ASSAY OF COUNTERCURRENT-DISTRIBUTION FRACTIONS: The microbiological assay of fractions obtained by countercurrent distribution (CCD fractions 0 to 11) showed that fractions 5 and 6 each produced a maximum growth response of 7 to 12 percent and that fraction 11 produced a slight growth response, which was of questionable significance. Fraction 0 produced a maximum growth response of 10 to 20 percent, indicating that some of the growth factor(s) in fraction III did not migrate in this solvent system.

These results obtained on CCD fractions by *L. casei* assay are similar to those obtained by Menge and Combs (1952) using chicks to assay CCD liver fractions.

ASSAY OF ION-EXCHANGE FRACTIONS: The use of ion-exchange columns with fraction IIIB resulted in considerable loss of growth-factor activity as measured by the *L. casei* assay. The growth factor(s) appeared to be adsorbed on the anion resin, since very little growth response was obtained from the unadsorbed material. The material obtained from the washings of the anion column gave a 5-to 10-percent maximum growth response. No material was adsorbed by the cation column.

ADDITIONAL STUDIES: Efforts to prepare fish-byproduct fractions that will yield greater information as to the number of growth factors present or as to the number of modifications in chemical structure of the growth factor(s) are now in progress.

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* * *

FISH OIL AND MEAL SAMPLES COLLECTED FOR EVALUATION

The U. S. Fish and Wildlife Service has completed arrangements with the menhaden plant operators for the collection at weekly intervals of fish-oil samples throughout the season. The purpose of this sampling program is to provide oils of known history as to season, locality of fish capture, and size of fish processed. Scientists at North Carolina State College in Raleigh are evaluating these oils for the principal physical and chemical constants including iodine value, free fatty acids, saponification value, unsaponifiable matter, refractive index, and color index.

The Service's College Park Fishery Technological Laboratory has obtained and packaged for distribution a large lot of fish meal and fish oil from a menhaden processing plant. These samples from the same lot of fish will be used as positive controls in the extensive chicken and swine feeding tests to be conducted at the University of Oregon at Corvallis, University of Delaware at Newark, and University of Connecticut at Storrs. They will also serve as common reference samples for the work on meal and oil that other contractors active in the newly inaugurated research program now have under way.

These projects are being financed by Saltonstall-Kennedy Act funds.

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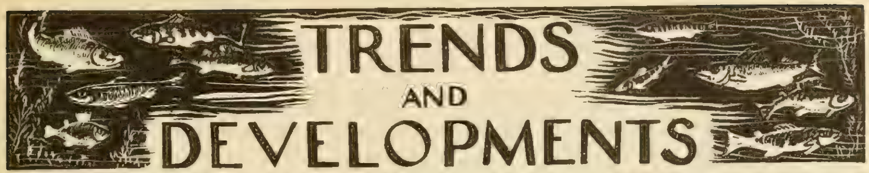


TRENDS AND DEVELOPMENTS

Additions to the U. S. Fleet of Fishing Vessels

A total of 42 vessels of 5 net tons and over were issued first documents as fishing craft during May 1955, according to the U. S. Bureau of Customs. This represents a decrease of 52 vessels (55 percent), compared with the 94 fishing craft reported for May 1954.

In the Gulf section only 6 vessels were documented as compared with 33 reported for May 1954--a decline of 82 percent. The South Atlantic and Pacific sections each had 13 additions, the Chesapeake Bay section 4, and the Middle Atlantic and Alaska sections each 3.

During the first five months of 1955 a total of 151 vessels was documented for the first time as fishing craft, compared with 366 for the corresponding period of last year--a decrease of 59 percent.

U. S. Vessels Issued First Documents as Fishing Craft, May 1955 and Comparisons

Section	May		Jan.-May		Total 1954
	1955	1954	1955	1954	
	(Number)				
New England	-	2	7	10	23
Middle Atlantic	3	6	8	8	15
Chesapeake Bay	4	19	15	47	93
South Atlantic	13	10	28	42	119
Gulf	6	33	35	186	313
Pacific	13	16	39	53	117
Great Lakes	-	-	2	3	6
Alaska	3	8	15	16	27
Hawaii	-	-	2	1	1
Puerto Rico	-	-	-	-	2
Unknown	-	-	-	-	1
Total	42	94	151	366	717

Note: Vessels have been assigned to the various sections on the basis of their home port.

American Samoa

TUNA CANNERY CONTRACTS WITH JAPANESE FISHING COMPANY: In order to obtain a supply of frozen tuna for its American Samoa tuna cannery, the United States firm operating that cannery has concluded a contract with a Japanese firm, a May 26 U. S. Embassy dispatch from Tokyo reports. The contract runs from June 1 to December 1, 1955, and contemplates a target catch of 3,750 metric tons with a sales price to the canner of US$275 a ton for albacore and US$190 a ton for light-meat tuna.

The Saipan Maru, a refrigerated vessel of 3,737 gross tons, has been chartered from a Japanese firm and will be used as a floating refrigerating plant at Samoa to freeze the tuna caught and brought to it by 20 Japanese fishing vessels.

California

TUNA TAGGED BY CLIPPER "VIRGINIA R." (Cruise C-55-1): A total of 1,016 yellowfin tuna and 18 skipjack tuna were tagged by the commercial tuna clipper *Virginia R.* on a three-months' cruise off the coast of Mexico, El Salvador, and Nicaragua (see table). The tagging and other biological work was done by scientists of the California Department of Fish and Game. No big-eyed tuna were tagged on the cruise. Type "G" spaghetti tags were used on all fish. A wet burlap sack placed over the head of the fish aided materially in expediting the tagging operations.

Tuna Tagged by *Virginia R.*, February 3 to April 30, 1955

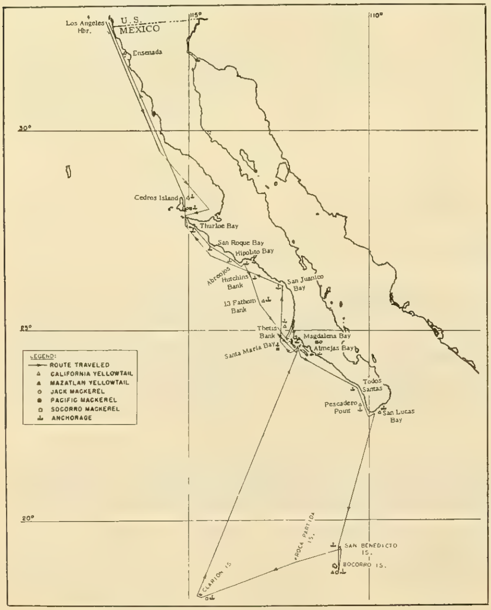
Area	Yellowfin	Skipjack	Big-eyed	Total
	. . . . (Number	of Fish)	. . . . . .	
Mexico	484	18	0	502
El Salvador and Nicaragua	532	0	0	532
Total	1,016	18	0	1,034

Weather observations and water temperature data were recorded at frequent intervals throughout the cruise.

Extensive night light collections yielded many specimens. Some fish were also taken from bait net and by hook and line.

* * * * *

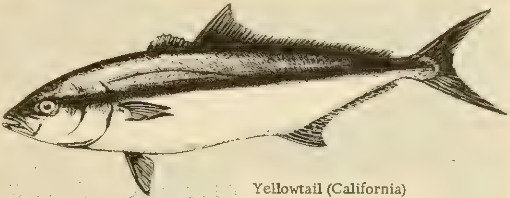
YELLOWTAIL TAGGED AND PACIFIC MACKEREL SPECIMENS COLLECTED OFF BAJA CALIFORNIA BY "YELLOWFIN" (Cruise 55-Y-3): A total of 211 yellowtail were tagged by the California Department of Fish and Game's research vessel *Yellowfin* on a one-month cruise off the coast of Baja California completed at Los Angeles May 1. Nearly 100 samples of Pacific mackerel from the Revilla Gigedo Islands for comparison with California Pacific mackerel were frozen for further study. Other biological objectives of the cruise were: to obtain specimens of black sea bass for special study; to collect algae specimens particularly from the new lava flow at San Benedicto Island; to further study the fish fauna of the Revilla Gigedo Islands; to collect various fish specimens, both live and preserved, for aquaria and scientific institutions.



Cruise 55-Y-3 of the M/V *Yellowfin*.

Bait hauls were made at Los Angeles Harbor (prior to departure), Almejas Bay, and Cedros Island. Anchovies taken at Los Angeles Harbor lasted to Clarion Island. Thread herring were taken at Almejas Bay and small jack mackerel at Cedros Island. No sardines were observed at any station.

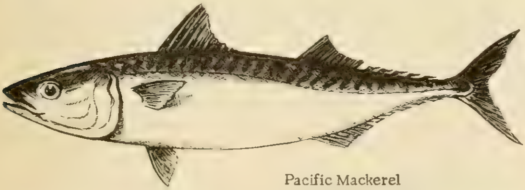
The vessel trolled various lures during all daylight hours when not at anchor. Shore collections were made at several localities. Gill nets and/or trammel nets were set at Socorro and Clarion Islands. Still fishing with live and cut bait was carried on at all anchorages. At all night anchorages a 1,500-watt light was placed over the side of the vessel to attract fish not ordinarily caught. Two drifting night light stations were made considerable distances from shore.



Yellowtail (California)
(Seriola dorsalis)

Water temperatures ranged from a low of 11.5° C. just south of Point San Eugenia to a maximum of 25.0° C. near Roca Partida. On the first leg of the trip temperatures remained below 18° C. until the vessel was more than halfway from Magdalena Bay to Cape San Lucas.

Of the 211 yellowtail tagged, 161 were taken in areas more southerly than previous tagging. Thirteen yellowtail were returned frozen for study at the Laboratory. Twenty-two were returned alive and given to Marineland of the Pacific.



Pacific Mackerel
(Pneumatophorus diego)

Thirty yellowtail specimens were preserved frozen for further study. Only three specimens of the Mazatlan yellowtail (from Panama) had been taken previously. Three live specimens were given to Marineland of the Pacific.

Good samples of Socorro mackerel were taken at both Socorro and Clarion Islands. Nearly 100 were brought back frozen for further study.

Only 4 yellowfin tuna and 2 skipjack tuna were caught on the cruise. One small yellowfin was preserved whole and the stomachs of all the others were frozen for further analysis.

Measurements and counts on seven black sea bass were taken in conjunction with a special study being made. Forty-five spotfin croaker and 20 corbina were brought back frozen for study by the Dingell-Johnson Surf Fish Project. Weight-length and stomach analysis data were recorded for 22 wahoo. Upward of 20 species of fish were added to the known fauna of the Revilla Gigedo Islands. Several hundred frozen and preserved specimens were brought back for utilization by various interested institutions and individuals.

* * * * *

RECORD PLANTING OF JAPANESE SEED OYSTERS: Results from the largest oyster-seed operation ever to take place in California were awaited with interest by commercial interests and State scientists, reports the April Outdoor California, a California Department of Fish and Game publication.

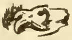
This great experimental planting by a California oyster company made in Arcata Bay north of Eureka, under conditions of hail, snow, sleet, rain, and high winds, followed receipt of 6,500 cases of seed oysters from Japan, the largest shipment ever received in California. Remainder of the tremendous shipment was planted in Drake's Estero and Tomales Bay in Marin County.

Marine Fisheries personnel reported that the new system of inspecting seed-oyster shipments in Japan, in cooperation with the State of Washington, greatly expedited the planting. An inspection for infestations of oyster drills on arrival would have delayed for two days planting of the highly perishable seed.

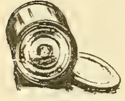
Marine Fisheries scientists pointed out that results from the Arcata planting probably will determine whether California will have a full-fledged oyster industry, or will continue with a moderate oyster culture only in the several bays north of Point Conception.

* * * * *

SHRIMP PRODUCTION, MAY 1955: May production of shrimp in California amounted to 75,000 pounds, that State's Department of Fish and Game reported on June 24. If this rate of catch continues, it could bring the 1955 total well over last year. The major fishing area has been Bodega Bay, Marin County. Shrimp fishing in the Morro Bay area has been almost a total failure thus far this season.



Cans--Shipments for Fishery Products, January-April 1955



Total shipments of metal cans for fish and sea food during January-April 1955 amounted to 23,881 short tons of steel (based on the amount of steel consumed in the manufacture of cans), compared to 20,476 short tons in the same period a year earlier.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF DEFENSE, MAY 1955: Fresh and frozen fishery products purchases for the military feeding of the U. S. Army, Navy, Marine Corps, and Air Force by the Army Quartermaster Corps in May 1955 amounted to 2.1 million pounds, valued at $0.9 million (see table). This was a decrease of 4.6 percent in quantity and 3.4 percent in value as compared with April purchases. May 1955 purchases were about the same in quantity and value as in May 1954.

Purchases of Fresh and Frozen Fishery Products by Department of Defense (May and the First Five Months of 1955 and 1954)

QUANTITY				VALUE			
May		Jan.-May		May		Jan.-May	
1955	1954	1955	1954	1955	1954	1955	1954
. . (Millions of Pounds) . .				. . (Millions of Dollars) . .			
2.1	2.1	10.8	9.1	.9	.9	4.6	3.9

Army Quartermaster Corps purchases of fresh and frozen fish during the first five months in 1955 totaled 10.8 million pounds (valued at $4.6 million), higher by 19.3 percent in quantity and 19.1 percent in value as compared with the similar period a year earlier.

Prices paid for fresh and frozen fishery products by the Department of Defense in May 1955 averaged 43.1 cents per pound as compared with 42.5 cents in April and 42.1 cents in May 1954.

In addition to the purchases of fresh and frozen fishery products indicated above, the Armed Forces generally make some local purchases which are not included in the above figures. Therefore, actual purchases are somewhat higher than indicated, but it is not possible to obtain data on the local purchases made by military installations throughout the country.

Fishery Products Marketing Prospects, July-Sept. 1955

OUTLOOK: Steady markets for domestic fishery products--with some weakness due to local oversupply--are forecast for this year's third quarter, according to the Commercial Fisheries Outlook, July-September 1955, issued by the U. S. Fish and Wildlife Service early in July.

A firm market is seen for fresh and frozen salmon, with supply liberal and demand good. The market for canned salmon should be firm, with supply moderate and demand good. Mild-cured salmon is expected to show a firm market, a moderate supply, and a good demand.

An unsettled market is predicted for canned tuna, with supply liberal and demand good. An industry-Government promotional campaign to move liberal supplies of this product into trade channels reached a peak in June and public response has been good. Tariff concessions on imported tuna (effective in September) along with requests by segments of the domestic tuna industry for Federal Government assistance, make it difficult to gauge future trends in imports and the domestic market. The domestic pack of tuna this year is not expected to equal that of last year.

Fresh and frozen shrimp are expected to show firm markets, moderate supplies, and good demand during the quarter. The market for canned shrimp will be firm, with supply moderate and demand good.

An unsettled market, firming towards the end of the quarter, is seen for fish meal, with supply liberal and demand good. Supply will be bulwarked by the maximum production which takes place during this July-September period. With more cattle and hogs being fed, and broiler replacements above average, demand for fish meal should maintain a good level throughout the quarter.

Supply, demand, and market for other fishery items during the quarter are expected to be as follows:

Item	Supply	Demand	Market
Salt-Water Fish:			
Anchovies, canned	Moderate	Slow	Dull
Fish sticks	Moderate to liberal	Good	Steady
Flounder and sole	Moderate	Good	Steady
Cod	Moderate to liberal	Good	Steady
Haddock	Liberal	Moderate	Steady
Ocean perch	Moderate	Good	Firm
Pollock	Light	Good	Firm
Halibut	Liberal	Moderate	Unsettled
Herring, sea (salted)	Light to moderate	Moderate	Firm
Mackerel, fresh and frozen	Moderate	Good	Firm
Mackerel, canned	Light	Light	Unsettled
Rockfishes, Pacific Coast	Moderate	Slow	Dull
Sablefish (black cod)	Moderate	Good	Firm
Sardines, canned	Liberal	Dull	Unsettled
Swordfish	Liberal	Good	Firm
Whiting	Liberal	Good	Fairly

Item	Supply	Demand	Market
Shellfish:			
Clams, fresh	Light	Good	Steady
Crabs and crab meat, fresh	Moderate to liberal	Active	Firm
Crabs and crab meat, canned	Moderate	Good	Firm
Lobsters, northern	Liberal	Good	Steady
Lobster tails, spiny	Moderate	Good	Firm
Oysters, fresh shucked	Light	Slow	Dull
Oysters, canned	Moderate	Moderate	Steady
Scallops, sea	Liberal	Good	Unsettled
Byproducts:			
Fish oils	Liberal	Good	Steady
Fish solubles	Liberal	Moderate	Steady

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MARKETING SITUATION AT MID-YEAR: An analysis of the fishery products marketing situation at mid-year, which appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the U. S. Fish and Wildlife Service, and published in the former agency's August 2 release of The National Food Situation (NFS-73), points out:

Consumption and Retail Prices: United States civilian per capita consumption of fishery products during the first half of 1955 was almost as large as that of a year earlier. Retail prices for fishery products, judging from wholesale price information, averaged somewhat lower than in the first half of last year.

Fresh and Frozen Fish: Landings of edible fish and shellfish by commercial fishermen during January-June totaled a little smaller than a year earlier. The sharp decline in the commercial landings of tuna was in large part offset by increases for several other fish.

Commercial freezings of fishery products in the United States and Alaska through June totaled 136 million pounds, 12 percent more than a year earlier. Freezings will continue to increase seasonally during the summer months, and for the year as a whole may total more than in 1954. Cold-storage holdings of frozen products on July 1 amounted to almost 140 million pounds, down 1 percent from those on the same date last year. Holdings of frozen fishery products will trend upward during the remainder of the year as supplies are built up for distribution during the winter of 1956.

Foreign Trade: Imports of important edible fishery products (excluding fresh and frozen tuna for canning) through the first half of this year probably were somewhat lower than a year earlier. During the first five months of 1955 receipts of major fresh and frozen fish from abroad were about 15 percent larger than in the same part of 1954. However, imports of canned sardines, salmon, and tuna were sharply lower this year. The decline in imports of the major types of canned fish is in large part a consequence of the larger domestic packs in 1954 and the larger stocks carried over into 1955.

Exports of important species of canned fish through April were much larger this year than last. Exports of canned Pacific sardines were five times the very low volume of a year earlier, and canned salmon exports were up more than a half.

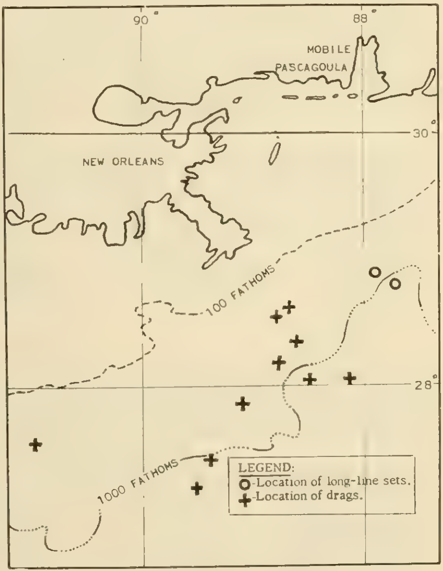
Gulf Exploratory Fishery Program

"OREGON" CATCHES LARGE YELLOWFIN TUNA IN GULF (Cruise 31): A total catch of 29 large yellowfin tuna was made by the Service's exploratory fishing vessel Oregon in the north central Gulf of Mexico during June 4-14. In general, fishing was poor. The yellowfin, averaging 149 pounds each, were caught in 10 long-line sets with an average of 300 hooks a set. Gonad examination revealed the fish were in spawning condition. This was the second half of Cruise 31 which was interrupted due to the necessity of having the vessel in Pascagoula during June 1-3 for inspection of the electrical system.

Of the 10 sets, 4 were made beyond the 1,000-fathom curve and yellowfin tuna were caught at the rate of 0.8 tuna per 100 hooks with no shark mutilation. The remaining 6 stations were made on the slope over depths of 550 to 1,000 fathoms and yellowfin were caught at a rate of slightly over 1 per 100 hooks. One-third of the catch was badly mutilated by sharks. Of interest was the capture of 3 large yellowfin on a night set off the Mississippi Delta.

In addition to the yellowfin catch, 48 sharks, 55 dolphin, 4 white marlin, 1 blue marlin, 1 sailfish, 2 blackfin tuna, and 1 little tuna were caught on the long lines. Three marlin were tagged and released in cooperation with the Woods Hole Oceanographic Institution.

The first half of the cruise (May 19-31) was spent dragging in the northeast gulf to gain basic information on the problems of bottom trawling in very deep water. Heavy seas greatly restricted fishing activities. However, a 40-foot trawl was successfully dragged down to depths of 1,150 to 1,200 fathoms. A single 40-basket set of long-line gear was made 60 miles southeast of the Mississippi Delta and caught 3 large yellowfin tuna.



Cruise 31 of the M/V Oregon.

Juvenile tuna were collected at night-light dip-net stations during the June leg of the trip. Trolling lines were run during daylight hours while the vessel was under way. However, only one little tuna was captured.

The Oregon was scheduled to leave Pascagoula on July 5. Due to the necessity of having the Oregon in Pascagoula during June 1-3 to permit inspection of the vessel's electrical system, the work scheduled for Cruise 31 was rescheduled for Cruise 32. This cruise has been planned to provide additional information on the presence of commercially-valuable stocks of red shrimp (Hymenopenaeus robustus) in the deep waters of the Florida Straits. A series of exploratory shrimp-trawl drags in depths of 170 to 250 fathoms south of Dry Tortugas in April 1954 yielded promising catches of red shrimp.

Additional red shrimp explorations will be carried out in areas of apparently good trawling bottom southeast of Cay Sal Bank. The Oregon was scheduled to return to Pascagoula on July 27.

* * *

Maine

SARDINE INDUSTRY LAUNCHES SUMMER-FALL PROMOTION: Consistent newspaper consumer advertisements in 136 cities and radio spots (on a several-times-a-day schedule over more than 200 high-power stations) will highlight the Maine sardine industry's summer-fall promotional campaign for canned Maine sardines.

In announcing details of the program, which started July 10, the Executive Secretary of the Maine Sardine Industry said that, in general, the coverage was national in scope but that the greatest advertising concentration would be in the Middle Atlantic, Southern, and Midwestern states.

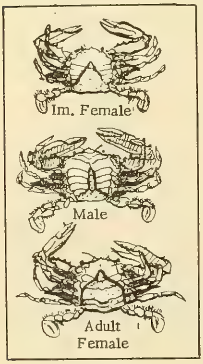
An extensive grocery, restaurant, and institutional trade-press schedule plus service to food editors and point-of-sale merchandising activities will also be used.

The advertising theme will be based on the advantages to housewives offered by canned sardines from Maine and the more than 100 brands of oil, mustard, and tomato-sauce sardines produced by the State's 40 plants will be featured.

"Our packers, along with all food manufacturers, are in the midst of the greatest competitive battle in history and consistent advertising is one of the chief ways in which we are meeting the challenge," the Executive Secretary said on July 7. "Distribution is no problem as 520,000 of the nation's 575,000 grocery outlets stock sardines from Maine. Our job is to get the public to buy them more often," he added.

Maryland

WHEREABOUTS OF BLUE CRABS IN CHESAPEAKE BAY DURING SPRING: The movements and locations of the various stages of the blue crab (*Callinectes sapidus*) are not generally well understood, reports the May 1955 *Maryland Tidewater News*, a Maryland Department of Research and Education publication. The whereabouts of the small crabs, sponge crabs, large or "Jimmie" crabs and, of course, the soft crabs, are of interest to fishermen. The small crabs, progeny of last year's spawners, can be found almost anywhere in Chesapeake Bay and its tributaries in the spring. Large numbers of these juvenile crabs have even been found in the heads of tidewater streams and rivers this spring, indicating that these crabs are able to withstand wide ranges of salinity. They have been taken, for example, as much as 50 miles above the mouth of the Patuxent River in relatively fresh water. Most of these juveniles will enter the soft and peeler-crab fishery in midsummer, while some may enter the hard-crab fishery in the fall.



Shape of "Apron" varies with sex and age.

Sponge crabs in Maryland waters are usually scarce in the spring, since the peak spawning period falls around June 15. Maryland, in any case, does not have a large population of these egg-bearing crabs owing to the lack of high-salinity waters. Research indicates that the larvae are unable to develop in waters where the salt content is much below that of the ocean. Virginia, on the other hand, in May had a tremendous population of crabs about to spawn. These are concentrated in the southern part of the Bay near the Capes. During the 1955 season the area from the York River southward harbors the greatest numbers of these individuals.

The large males are found during May and early June in the deeper parts of the Bay and rivers. After their journey north during their first year, they remain scattered throughout the Bay and its tributaries. Local movements take place while the crabs are feeding or mating, but the males do not make large-scale migrations as do mature females in the fall. Fishermen believe these overwinter in a state of semihibernation in the deepest holes and channels. As the water warms, they begin to move into more shallow areas to feed. Thus in May they are found in 15 to 40 feet of water. Crab pots are set at these depths and take the major portion of the catch at this season. Later the crabs will move even farther shoreward and become available to the trot liners and sport crabbers.

Soft and peeler crabs are also widely distributed, although they are not common in deep water. The grassy flats, weedy sloughs, creeks, and river shores all furnish the necessary protection for the growing crab which is about to begin its first shedding of the season. Peelers which shed in these protected areas spend the critical soft period in seclusion and safety. Fish, birds, and man, and even other crabs, all prey upon the soft or peeler crab for both food and, in the case of man, fishing bait. Primary areas for catching soft and peeler crabs commercially are Tangier Sound, Pocomoke Sound, Fishing Bay, and Honga River.

The Maryland crabber has learned to adjust his fishing techniques to the biology and movement of crabs. This he has learned from experience and from knowledge handed down from generation to generation. Crabs in almost all stages are present in springtime and are easily observed. The commercial waterman depends upon his ability to know where the different stages are, their relative abundance, and the best time and method for catching them. Many crabbers move their gear every week, basing their moves on previous experience, knowing how the effects of climate and weather affect the location and behavior of crabs.

* * * * *

OVER 2 MILLION OYSTER SHELLS TO BE PLANTED: Over 2 million bushels of oyster shells will be planted by the Maryland Department of Tidewater Fisheries on the public bars of the State this year, reports the Chairman of that Department.

The Department has an annual appropriation of $250,000 for oyster propagation, plus laws which require that every packer must return 50 percent of the shells he has made to the State for planting on the bars.

The State of Maryland in some years makes some seed available to private oyster farmers. After the middle of April seed in the St. Mary's River was made available for purchase. A tax of 50 cents per bushel was charged by the State and the planter in addition had to pay tongers for catching the seed. Only a limited number of growers made purchases since the percentage of shells was high and the count of oysters low.

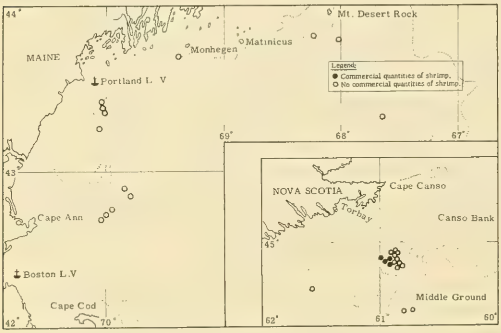
Michigan

SEA LAMPREY CONTROL WORK INCREASED: Michigan's sea lamprey control work will be nearly tripled during the coming fiscal year, reports a recent bulletin from the Michigan Department of Conservation. The Michigan legislature appropriated $29,000 for weirs, research, and other work to battle the fish predator. About $10,000 was appropriated in the previous fiscal year.

North Atlantic Fisheries Exploration and Gear Research[1]

NORTHERN SHRIMP CAUGHT IN COMMERCIAL QUANTITIES OFF NOVA SCOTIA BY "DELAWARE" (Cruise 6): Commercial quantities of northern shrimp (*Pandalus borealis*) were caught off the coast of Nova Scotia but not in the Gulf of Maine by the Service's exploratory fishing vessel *Delaware* on an 11-day cruise that ended at Boston June 9. This was the fifth cruise of a series designed to discover the reasons for the failure of the Maine fishery for northern shrimp.

It has been hypothesized that the distribution of northern shrimp might have shifted north as a consequence of the warming of bottom waters which has occurred in recent years. Therefore, exploratory fishing was conducted not only on the former fishing grounds in the Gulf of Maine, but to the northeast as well.



M/V *Delaware* Exploratory Cruise 6, May 31-June 10, 1955.

A total of 29 tows was made--16 were made off the coast of Nova Scotia, while 13 were made in the Gulf of Maine. Gear used was a fine-meshed No. 36 shrimp trawl, and a No. 41 balloon trawl, with a fine-meshed liner in the cod end.

The largest catch was made in tow No. 15 when 502 pounds were taken. The shrimp caught were "clean" and not mixed with much trash. Average length of the shrimp caught in this tow was 89 mm. (3.5 inches), which is slightly less than the average size of those taken in the former Maine fishery.

Samples of brine-frozen shrimp were turned over to five fish-processing companies for determination of marketability; and one sample was turned over to the Harvard Biological Laboratory for use in research on hormonal control of activity in crustacea.

The *Delaware* is scheduled to depart on Cruise 7 on June 20 for a 12-day cruise to continue the reconnaisance of the fishery resources on the edge of the Continental Shelf south of Georges Bank.

* * * * *

COMMERCIAL QUANTITIES OF OCEAN PERCH AND WHITING TAKEN BY "DELAWARE" IN DEEP WATER (Cruise No. 7): Only in the eastern portion of the survey area (the edge of the continental shelf, south of Georges Bank, westward to due south of Nantucket) were commercial quantities of ocean perch (*Sebastes marinus*) and whiting (*Merluccius bilinearis*) taken by the Service's exploratory fishery vessel *Delaware* on Cruise No. 7. Poor catches were made in the western portion. The twelve-day cruise, which ended July 1 at East Boston, was the fourth in a series designed to explore the availability of bottom species on the edge of the continental shelf, in waters deeper than are ordinarily fished commercially.

The gear used was a No. 41 standard trawl, and a No. 41 balloon trawl. Tows (a total of 41) were made in the depth range 100 to 420 fathoms, with intermediate tows successively at 150, 200, 250, 300, and 350 fathoms.

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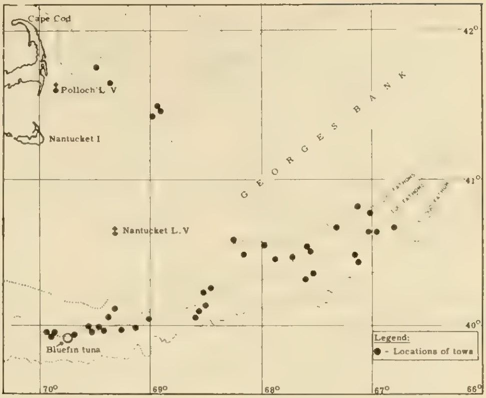
[1] Formerly known as the "New England Exploratory Fishery Program."

The western portion of the survey area proved unproductive of groundfish. The American lobster (*Homarus americanus*) was not as abundant as in other areas of the continental shelf.

A total of 1,000 pounds of bluefin tuna (*Thunnus thynnus*) were taken by handlines on June 28. The fish were observed feeding on squid escaping through the meshes of the trawling net. Size of the tuna ranged from 15 to 60 pounds. Location of the catch was latitude 39°55' N., longitude 69°45' W. (see chart).



M/V *Delaware* Exploratory Cruise 7, June 22-30, 1955.

A sample of bluefin tuna was turned over to a local processor for experimental purposes. Thirty-two live lobsters were turned over to the Massachusetts Division of Marine Fisheries for marking and release.

North Atlantic Fisheries Investigations

HADDOCK EGGS AND LARVAE STUDIES CONTINUED BY "ALBATROSS III" (Cruise 61): In order to determine the distribution of haddock eggs and larvae, temperature and salinity, and the general circulation pattern, the Service's research fishing vessel *Albatross III* made a cruise to Georges Bank, Browns Bank, Gulf of Maine, and Southern New England Banks. The cruise commenced May 16 and was completed May 28 at Woods Hole, Mass.

Over 3,000 miles of continuous plankton tows were made at the surface and 10 meters with Hardy Plankton Recorders. A total of 266 bathythermograph lowerings, 136 salinity samples, and 18 surface tows with the standard meter net were made. Seventeen samples of eggs were hatched out for identification purposes. A total of 672 drift bottles were released throughout the area.

Witch flounder, cusk, rockling, haddock, cod, whiting, yellowtail, and mackerel eggs; and launce, haddock, eel, hake larvae and post larvae were found. Haddock larvae were found in the South Channel, 30 miles south of Block Island, and off Gay Head.

North Atlantic Herring Research

JOINT U. S.-CANADIAN INVESTIGATION OF HERRING RESOURCES LAUNCHED BY "T. N. GILL" (Cruise 1) AND "HARENGUS:" Both the Fisheries Research Board of Canada and the U. S. Fish and Wildlife Service are investigating the herring resources of the Gulf of Maine and the Bay of Fundy. Because of a common interest, some parts of the investigations are being coordinated. The research cruises are planned jointly so that no overlapping of effort occurs.

The first cruises in the areas were made in April. Two vessels were used--the 84-foot Canadian Harengus and the 97-foot United States T. N. Gill, both of which are equipped with recording echo-sounders which sound vertically and "Sea Scanars" which are capable of sounding both vertically and horizontally. These devices assist in locating subsurface schools of herring. Other special equipment on both ships includes bathythermographs to measure the vertical gradation in water temperature and plankton nets to capture the larval and young herring floating in the water.

The T. N. Gill left Boothbay Harbor on April 20 to investigate the waters of the Gulf of Maine west of 67°30' W. longitude (west of Englishman Bay). The Harengus was scheduled to cover the Gulf waters east of this meridian and the Bay of Fundy. It was planned to cover the Gulf along a series of courses parallel to the coastline and spaced 10 miles apart as far offshore as time and weather would permit.

Two of these courses were actually run by the T. N. Gill at distances of 5 and 10 miles offshore from 67°30' W. longitude to the southeastern tip of Cape Cod. During the cruise, bathythermograph temperature records were taken at 10-mile intervals, and plankton tows were made at 30-mile intervals. The "Sea Scanar" and recording-type vertical echo-sounder were run continuously 24 hours per day in an effort to locate subsurface schools of herring.

Small scattered schools were indicated both on the "Sea Scanar" and the recording sounder at 5 miles offshore in Cape Cod Bay near Provincetown. While positive identification was not made, the schools made sounder markings characteristic of small herring schools.

A scattering of surface-swimming fish was observed near the Boston Lightship during the nights of April 21 and April 22.

This cruise was cut short on April 24 due to failure of the propulsion engine of the T. N. Gill. The work will be continued as soon as the vessel is repaired.

The Harengus sailed from Digby, Nova Scotia, on April 18 and carried out similar investigations in the Bay of Fundy and to the west of Nova Scotia.

Two large schools of herring were located during the cruise, the first on April 25 about 10 miles NNW. from Petit Passage, Digby County, in the Bay of Fundy, and the second on April 27 about 65 miles W. by S. of Yarmouth, Nova Scotia. No other indications of large herring were seen, although larval herring were taken frequently in the plankton tows.

Cruise 2 of the T. N. Gill was due to start on May 23. The primary objective of this cruise was to explore the inshore waters of the Gulf in an attempt to gain information on the distribution of herring at this season. It was also planned to make several runs to a distance of 100 miles offshore to give some coverage of the outside waters which could not be sounded during Cruise No. 1 as had been planned. Plankton collections and water temperature records were to be made as part of the program to describe the biology of the Gulf of Maine herring.

It was planned to sound all the navigable bays and inlets along the Gulf from Passamaquoddy Bay to Cape Ann, using a "Sea Scanar" and a vertical echo-sounder. Several types of fishing gear designed for sampling herring schools were to be tried out. These include a bait seine of the small lampara type, a six-foot lift net, and a small mid-water trawl.

A radio report will be given from the vessel when any good-sized schools of herring are located. These reports will be broadcast at 3 p.m. E.D.T. on 2638 kilocycles.

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SMALL HERRING SCHOOLS LOCATED IN INSIDE WATERS BORDERING GULF OF MAINE BY "THEODORE N. GILL" (Cruise No. 2): Extensive schools of small herring were located in Casco Bay, Sheepscot River, Damariscotta River, Muscongus Bay, St. George River, Penobscot Bay, Blue Hill Bay, Frenchman Bay, and Machias Bay during the second cruise of the Service's vessel Theodore N. Gill, presently being used in exploratory fishing and biological investigations on the Maine herring fishery. The cruise started on May 23, was interrupted on May 27 when the vessel struck a submerged rock in Muscongus Bay, and after 12 days spent repairing the damage, the cruise was resumed on June 9. On June 20 the cruise was completed. Most of the inside waters bordering the Gulf of Maine were sounded with a recording echo-sounder and with a scanning-type of echo-ranging device. The extensive schools of herring located were sampled in most of these areas with a lampara seine.

The average size of the fish taken in each area varied from 2.0 to 2.6 inches, fork length (tip of nose to fork of tail). Larger fish may have been present on the bottom in deeper waters.

Four runs were made offshore and back inshore on parallel courses 30 miles apart to a distance of 75 miles offshore. Surface schools of herring were observed 18 miles west of Cape May, Nova Scotia, and at distances of 18, 42, and 57 miles southeast by south of Mount Desert Island.

Traces of scattered schools of fish were indicated at various points throughout the Gulf in midwater and on the bottom. Some of these deeper-lying schools may have been herring, but positive identification could not be made.

Radio broadcasts were made at 3 p.m. daily on 2638 kc. while the vessel was in operation, giving the results of each day's work.

The Theodore N. Gill, sailed on June 27, 1955, on the third of a series of cruises presently being made in the Gulf of Maine and adjacent inside waters in an attempt to ascertain the seasonal distribution of herring populations. As in the previous two cruises, the waters will be sounded with recording-type and scanning-type echo-sounding devices.

The principal objective of this third cruise is to sound for herring schools in the outside waters within approximately 10 miles of the shoreline and in the inside waters of the numerous bays and inlets along the Gulf coast east of Cape Ann. Attempts will be made to catch samples of schools sounded with a lift net or a lampara seine in order to determine the average size of the fish. Plankton tows and water temperature recordings will be made as in previous cruises as part of the long-range program to define the stocks and determine the life history of the Atlantic herring.

Radio broadcasts will be made at 3 p.m. daily, giving the results of each day's work. The cruise is scheduled for completion on July 8.

North Pacific Exploratory Fishery Program

"JOHN N. COBB" TO SEARCH FOR SALMON IN OFFSHORE WATERS OF NORTH PACIFIC: To obtain information on the high-seas distribution, abundance, life history, racial composition, etc. of North Pacific salmon in the Gulf of Alaska and adjacent offshore waters of the North Pacific, the Service's exploratory fishing vessel John N. Cobb left Seattle on June 23. Scheduled to return about September 20, the vessel will also catch salmon on the high seas in condition for tagging; collect salmon from various localities for studies of racial determination, size composition, age analysis, and other related data; and make oceanographic observations in connection with the fishing activities. A series of predesignated stations will be worked extending from off Northern Vancouver Island to off Unalaska Island, Alaska.

The primary fishing gear will be nylon gill nets of various mesh sizes designed to catch both mature and immature salmon. A series of east-west transects will be run across the Gulf of Alaska with fishing stations at 60-mile intervals. Special attention will be given to an area southeast of Kodiak Island which is reported to be rich in plankton. A limited amount of experimental fishing will be done with surface long lines and trolling gear in addition to the gill nets.

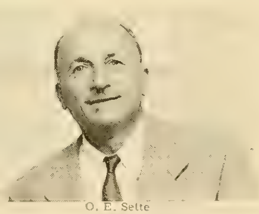
Scientific personnel from the Branch of Fishery Biology and from the Department of Oceanography, University of Washington, will participate in the research. All salmon caught in suitable condition will be tagged and released. Morphometric measurements, stomach analyses, blood samples, and other biological data will be obtained. Oceanographic observations, including water samples, temperatures, etc., will be taken at each fishing station and at other regular intervals.

This is a part of the research program approved by the International North Pacific Fisheries Commission. Liaison will be maintained when possible between the *John N. Cobb* and other research vessels operating in nearby waters. Information obtained will be coordinated with that of other agencies carrying out research on North Pacific salmon.

Oceanic Research Unit Set Up by Service in California

A new oceanic research project by the U. S. Fish & Wildlife Service will begin on September 1 and will be based at Stanford, Calif. O. E. Sette, Director of the Service's Pacific Oceanic Fishery Investigations in Honolulu, T. H., since 1948, is being transferred to the West Coast to head the important new oceanic research project, Acting Secretary of the Interior Davis announced June 22. Under the direction of Sette, the unit will conduct a study to relate fishery production to climate and ocean conditions. The relations between variations in ocean circulation and the sudden and as yet unexplained appearances and disappearances of commercial fish stocks from the customary fishing grounds will be studied on a broad scale. The work will be of a pioneering nature in three fields of science--fishery biology, oceanography, and meteorology.

Dr. A. L. Tester



O. E. Sette

The ultimate purpose of the project, according to Service Director John L. Farley, is to discover the natural laws governing fluctuations in abundance of our great commercial fisheries. "Such laws, if they exist and are discovered," he said, "would probably have a general application and as profound an effect on world progress in fishery science as did Newton's laws of motion in mechanics or Ohm's law in electricity."

The Service Director explained that the need for such a study has been demonstrated by the fact that many of our important sea fisheries are subject to large, unexpected and sometimes catastrophic failures. Recent advances in oceanography and meteorology, however, suggest that the abundance of fish may be greatly affected by large-scale changes in the weather pattern. If the study of ocean-wide events, as they may be related to worldwide weather fluctuations, discloses the causes of major fishery fluctuations, then it may be possible to predict future fluctuations.

Sette has been selected to head the new project because of his extensive experience in both fishery and oceanographic studies. He has been with the Fish and Wildlife Service and its predecessor agency, the Bureau of Fisheries, since 1924. From that date until 1929 he was chief of the division now known as the Branch of Commercial Fisheries. From 1929 to 1937 he conducted marine fisheries investigations on the Atlantic coast. During the period from 1937 to August 1948 he conducted studies on the sardine fishery from headquarters at Stanford University in California. During World War II he was detailed as Area Coordinator of Fisheries for California. He has been director of the P.O.F.I. research since 1948. Mr. Sette recently returned from Italy where he served as one of the United States delegates to the International Technical Conference on the Conservation of the Living Resources of the Sea, which convened at Rome on April 18.

Sette will be succeeded in Honolulu on July 1 by Dr. Albert L. Tester who, as senior professor of zoology at the University of Hawaii, has been in charge of the University's fishery education and research program since 1948.

Tester was born in Toronto, Ontario, Canada, and acquired United States citizenship in 1954. From June 1931 to August 1938, he was associated with the Pacific Biological Station of the Fisheries Research Board of Canada, located at Nanaimo, B. C. Since joining the University of Hawaii in 1948, Tester has worked closely with the P.O.F.I. staff.

The P.O.F.I. program was authorized by the 80th Congress to conduct fishing explorations and necessary related oceanographical, biological, technological, statistical, and economic studies to insure maximum development and utilization of the high seas fishery resources of the Territories and island possessions of the United States in the tropical and subtropical Pacific Ocean and intervening areas.

Saltonstall-Kennedy Act Fisheries Projects

SERVICE COMPLETES COMMITMENT OF FIRST YEAR'S FUNDS: "The American commercial fishing industry is now in a better position to realize its production and marketing potential than at any previous time in its long history," Acting Secretary of the Interior Clarence A. Davis declared June 30 when he announced the signing of contracts totaling $705,000 for fishery research and market development projects.

These new contracts, between the U. S. Fish and Wildlife Service and college and research organizations, complete the commitment of the $3 million authorized for fiscal year 1955 under the Saltonstall-Kennedy Act (P.L. 466, 83d Congress). This legislation, designed to promote trade in domestically-produced fishery products, provides that an amount equal to 30 percent of duties collected under the customs laws on fishery products shall be transferred annually for three years from the Department of Agriculture to the Department of the Interior.

Expanded production and the development of new markets for fishery products are expected to result from this coordinated Government-industry program which has been drafted to produce practical results for the industry in the shortest possible time.

Acting Secretary Davis commended the American Fisheries Advisory Committee for its assistance in the research and development program. "The advice and counsel given to us by this group of experts from the commercial fishing industry for the best use of Saltonstall-Kennedy funds has been of inestimable value in getting this program off to such a splendid start," Davis said. "We look forward to working in close partnership with this Committee."

The Advisory Committee consists of 19 representatives of all segments of the United States fishing industry from all sections of the country.

The final contracts signed for fiscal year 1955 include the following projects:

Salmon: A study of the effect of predation on the mortality of Alaska salmon in their stream and ocean environments; with the Alaska Department of Fisheries, $25,000 for one year. Voracious fishes, birds, and marine mammals are known to destroy large quantities of salmon. Information gained from this study will serve as the basis of policies regarding the reduction of certain predator populations for the sake of improving the abundance of salmon. This contract brings salmon-research activities under the Saltonstall-Kennedy Act to a total of about $215,000 for the 1955 fiscal year.

North Atlantic Trawl Fishes: An investigation of climatic and oceanographic factors influencing the abundance and distribution of Atlantic fish populations; with the Woods Hole Oceanographic Institution, Woods Hole, Mass., $200,000 for three years. With previous allocations of about $270,000 for North Atlantic activities, this contract brings the total to about $470,000.

Gulf of Mexico: A biological study of the Florida sponge grounds and the extent and density of the sponge population supporting the industry which operated in extraterritorial waters; with the University of Miami Marine Laboratory in Florida, $20,000 for one year. An epidemic-wasting disease has twice (1938-39 and 1948-49) seriously reduced the quantity of marketable sponges. Effective biological management of the sponge fishery and administration of the Federal Sponge Law are dependent upon reliable biological data. Previous allocations of about $53,000 were made for biological research in the Gulf of Mexico primarily on the study of causes and control of toxic red tide on the Florida west coast.

Publications: Publication of a much-needed volume on fishery biology which will contain in easily referenced tabular form data already collected on certain species for such items as chemical composition, temperature tolerances, salinity preferences and tolerances, breeding habits, average life spans, and mortality rates; with the National Academy of Sciences in Washington, D. C., $15,000.

Middle Atlantic Oysters: Research on oyster drills (marine snails) which cause millions of dollars in losses each year to the oyster crop; three contracts for $83,989. One of these contracts (for $24,000 extending for three years) has been signed with the Virginia Fisheries Laboratory to study the life history of oyster drills. Under a three-year contract with the University of North Carolina (for $16,844), a comparative study will be made of the structure and functions of the snail's drilling organs to develop control possibilities. A third three-year contract with the Oyster Institute of North America (for $43,145) will center on experimental salt-water pond cultivation of oysters and clams under protected conditions. Approximately $65,000 was previously allocated for study of oyster predators and seed oysters.

Channel Catfish: Development of improved techniques for the propagation of channel catfish which is a choice one in the Midwest, South, and Southeast; with the University of Oklahoma, $20,300. Commercial fish farms have attempted to rear these catfish to meet stocking demands but have failed for lack of knowledge about the fish and its requirements.

Gulf of Mexico Explorations: Overhaul of the electrical system on the exploratory fishing vessel Oregon which operates in the Gulf of Mexico; with the Gulf Marine Ways, Inc., Pascagoula, Miss., $39,000.

Gear Development and Research: Purchase and outfitting of a gear research vessel to replace the Pompano at Coral Gables, Fla.; $70,000. Such a vessel is needed to conduct experiments with new and improved types of fishing gear, underwater television, electronic devices, and other methods of locating and catching fish designed to increase the efficiency of commercial fisherman.

Development of Voluntary Standards: An educational and training film showing the application of voluntary Federal standards and conditions to the inspection and grading of fish and fishery products, with Lee Productions, New York, N. Y., $12,000. A study of the principal characteristics of breaded shrimp as now commercially packed; with the University of Massachusetts at Amherst, $14,898. Development of grades and standards for natural sponges to aid in the marketing of this product; with the University of Florida at Gainesville, $6,000. A study for improvement in methods of freezing skipjack tuna at sea; with the California Fish and Game Commission, $10,000. A study of the modification of fish oils by chemical treatment and the testing of these products for applications in such industrial products as coatings, water-proofings, and improved surface finishes; contract with Arthur D. Little, Inc., Boston, Mass., a commercial research organization, for $16,500 is pending. Other standards work so far undertaken is being financed with allocations of about $100,000.

Commercial Fishery Economic Studies: A study of the economics of fish distribution on the Pacific coast to determine: (1) consumption and prices of different varieties of fish in the major Pacific coast consuming centers and (2) the market potential for fish in the Pacific coast States; with Oregon State College at Corvallis, $50,000 for 18 months. The project will undertake to survey major fish-consuming markets in California, Oregon, and Washington to determine sources of supply, marketing channels and practices, and prices.

A study of the fishing industry's hull and protection and indemnity insurance problems; with Boston University, Boston, Mass., $50,000. A contract is now under negotiation. Rates and premiums for this insurance have reached phenomenal levels in many segments of the industry. Vessel operations on all coasts have been hampered by this condition. Recommendations resulting from the project should lead to better operating conditions under present insuring methods or new and better insuring methods, both of which should result in lower insurance costs for commercial fishermen. These contracts bring to a total of $243,000 the economic studies being conducted under the Saltonstall-Kennedy Act in fiscal year 1955.

Marketing of Fishery Products: A study of the marketing of fishery products in the metropolitan areas of Philadelphia, Cleveland, St. Louis, Detroit, Baltimore, Atlanta, Minneapolis-St. Paul, and Houston, to determine local consumption of and marketing practices for fishery products; with A. J. Wood & Co., a market research firm, $24,950. This is a field in which information is almost totally lacking. The study is expected to provide background for the orderly expansion of market news, statistics, and economic coverage, and also reveal information on the possibility of expanding the sale of fishery products in those areas.

Expansion of Education and Market Development Activities: The replacement of the Fish and Wildlife Service's educational motion picture prints; $24,000 has been earmarked for this project. Heavy circulation of these Service-supervised productions has caused such deterioration that it is necessary to replace many of the prints and obtain a larger number of copies in order to meet distribution demands. Preparation of a group of fishery educational exhibits for use at national conventions; $10,000 has been set aside. Preparation of an educational motion picture on nutritive values of fishery products; with Lee Productions, New York, N. Y., $13,000 has been allocated. This film will give the general public a better understanding of the dietary advantages to be gained by eating fish and shellfish. Previous allocations for educational and market development activities amounted to about $255,000.

In placing all of these new contracts, the Fish and Wildlife Service has tried to avail itself of the most experienced groups active in each particular field, and located where contract research, Service research, and industry assistance could be best integrated.

* * * * *

SERVICE TO SURVEY FISHING VESSEL INSURANCE PROBLEMS: A nationwide survey aimed at bringing about lower insurance rates for domestic fishing craft by reducing losses was announced July 19 by Secretary of the Interior McKay. The survey will be conducted by Boston University's Bureau of Business Research under the supervision of the U. S. Fish and Wildlife Service. It is the latest in a series of projects made possible by the Saltonstall-Kennedy Act--designed to aid the United States fishing industry through research and development.

Preliminary work is now under way by virtue of a Government contract whereby $50,000 was made available to the university on June 30 for operations to extend over a period of 18 months. Personal interviews with insurance people will reveal premimum incomes, claim payments, expenses, and profit or loss. Interviews with vessel owners will bring forth information on loss experiences.

Some of the more important questions to be asked in the survey are: (1) What are the effects of present conditions in the insurance field upon the economic situation in the fishing industry? (2) What is the frequency and severity of losses? (3) What relation do present expenditures for safety have to total cost of operation? (4) Why have many domestic insurance companies withdrawn from the field? (5) What are the problems of safety equipment and safety education in the fishing industry and can insurance costs be reduced by safety work? (6) What role can labor unions play in the solution of the problem? (7) Is there a need for new and expanded insurance programs? (8) Has there been (and is there still) a reluctance on the part of fishing craft owners to install safety equipment and establish safety rules?

While the scope of the survey has been determined by the Fish and Wildlife Service, the actual operations will be administered by James W. Kelley, Director of the University's Bureau of Business Research, Professor Warner C. Danforth of the Bureau (directly in charge of the work), and Professor R. H. Blanchard of Columbia University who will serve as a special consultant.

* * * * *

SHRIMP MERCHANDISING PRACTICES STUDIED BY SERVICE: A nationwide survey of merchandising practices in the shrimp industry was launched June 22 when Department of the Interior officials met with representatives of the A. C. Nielsen Company (marketing research firm under Government contract to carry out the work), Acting Secretary of the Interior Davis announced June 22.

The survey will be supervised by the U. S. Fish and Wildlife Service which let the $13,784 ten-month's contract in implementing provisions of the Saltonstall-Kennedy Act. This Act, created in the 83d Congress and signed into law by President Eisenhower last year, is designed to "promote the free flow of domestically produced fishery products in commerce."

Research aimed at improving sales and distribution of shrimp products through wholesale and retail marketing channels will be the principal feature of the survey.

Consumer-preference tests also will be conducted in New York City, Chicago, Harrisburg (Pa.), and Waterloo (Iowa).

The Service will coordinate this work with other studies of the shrimp industry being conducted with Saltonstall-Kennedy Act funds. Contracts previously let by the Service for economic research into the industry have resulted in the following activities: accountants of the Federal Trade Commission are currently engaged in cost studies of shrimp-vessel and shrimp packing plant operations; the research firm of Harwell, Knowles and Associates is making a general study of shrimp-vessel efficiency; work practices on shrimp vessels and operating efficiency in shrimp processing plants are being studied by the First Research Corporation of Florida; and the University of Miami's bureau of business and economic research is probing the problems of primary shrimp marketing and ex-vessel sales.

Other aspects of the shrimp industry are being studied by Fish and Wildlife Service specialists on a noncontract basis. These aspects include the historical development of our domestic fisheries; potential fishery resources; demand for shrimp products; domestic and foreign markets; foreign competition; and differences between retail and fishermen's prices. The objectives of these studies are: to reduce operating costs of vessels and plants through technical advances; to increase consumption through improved distribution, product quality, and merchandising; and to effect an output that will assure maximum total income.

The United States shrimp industry--one of the most lucrative of all our commercial fishing enterprises--produces about 225 million pounds of shrimp annually valued at around $50 million, according to Service estimates. The industry provides a livelihood for approximately 15,000 fishermen and contributes to the income of another 15,000 employees in 600 shore establishments. Shrimp are distributed domestically by 1,500 wholesale firms and 170,000 retail stores.

* * * * *

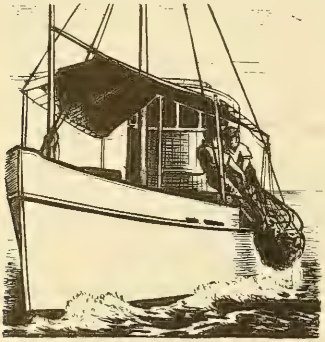
SERVICE OPENS TWO NEW FISHERY STATISTICAL OFFICES: A statistical office for the collection of fishery data was recently opened at Pascagoula, Miss., by the Branch of Commercial Fisheries, U. S. Fish and Wildlife Service. Activities of the Pascagoula office will include the collection of detailed data on employment in the fisheries, number of craft and quantity of gear operated, the catch of fishery products, and the collection of related data in the vicinity of Pascagoula. Detailed statistics on the shrimp fishery will be obtained for that area in connection with the Service's expanded program for the collection of shrimp statistics. Donald T. Montgomery will be in charge of the office.

Another statistical office for the collection of fishery data has been opened at Providence, R. I. Activities of the Providence office include the collection of detailed data on employment in the fisheries, number of craft and quantity of gear operated, the catch of fishery products, and the collection of related data in Rhode Island and Connecticut. The office will also cooperate with the Rhode Island Department of Agriculture and Conservation Division of Fish and Game in the preparation of a monthly bulletin on the landings of fishery products in Rhode Island. Francis Riley, who has been in charge of the Provincetown, Mass., statistical office of the Branch, will be in charge of the Providence office.

These projects are being financed by funds provided by the Saltonstall-Kennedy Act (68th Stat. 376).

Status of Long Island Oysters

Because of the comparatively light sets of oysters occurring in Long Island Sound since 1945 and because of the heavy damage to the crops caused by several severe hurricanes passing over the Sound, the oyster industry entered the 1955 season with a relatively small reserve of oysters. It was hoped, nevertheless, that this summer would be one of heavy set to enable the industry to build up its resources. Whether this hope will be justified was impossible to predict, according to Bulletin 2, released June 3 by the Service's Biological Laboratory at Milford, Conn.


Hauling oysters aboard a Long Island dredger.

The history of the industry shows that good oyster sets in the open waters of Long Island Sound are not too frequent. Examination of the records available showed that in the last 55 years only 6, or perhaps 7, good general sets occurred in the Sound. The remaining years were either complete failures or so-called marginal years during which heavy sets occurred only in certain rather limited areas.

At times a good heavy general set did not occur for many years in succession. For example, it is known from examination of the records that such was the period of 21 years extending between 1904 and 1925. However, even after that prolonged period of poor setting the industry quickly recovered after the set of 1925 increased the oyster population of the Sound manyfold.

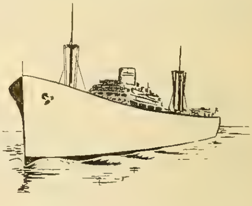
U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, APRIL 1955: United States imports of fresh, frozen, and processed edible fish and shellfish in April 1955 amounted to 57.2 million pounds (valued at $14.7 million), according to a Department of Commerce summary tabulation (see table). This was a decrease of 25 percent in quantity and 21 percent in value as compared with March imports of 76.7 million pounds (valued at $18.5 million). Compared with a year earlier, April imports were down 25 percent in quantity and 25 percent lower in value.

United States Foreign Trade in Edible Fishery Products, April 1955 with Comparisons

Item	Quantity			Value		
	Apr.		Year	Apr.		Year
	1955	1954	1954	1955	1954	1954
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: fresh, frozen, & processed1/ . .	57.2	76.7	801.7	14.7	19.6	202.8
Exports:						
Fish & shellfish: processed1/ only (excluding fresh and frozen) . .	9.0	3.2	50.8	2.6	0.7	13.2

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.



Exports of processed edible fish and shellfish (excluding fresh and frozen) in April 1955 totaled 9.0 million pounds (valued at $2.6 million)--an increase of 27 percent in quantity and 63 percent in value as compared with March exports of 7.1 million pounds (valued at $1.6 million). April exports were higher by 181 percent in quantity and 271 percent in value as compared with a year earlier.

Wholesale Prices, June 1955

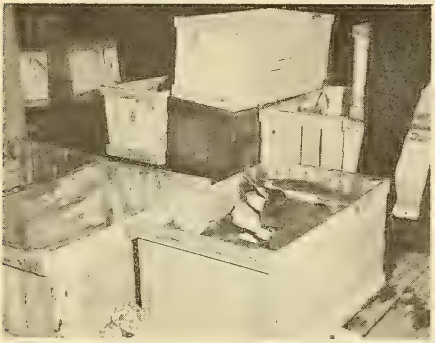
Good demand and a moderate supply were responsible for the sharp rise in wholesale prices of edible fishery products from May to June. The over-all index of edible fish and shellfish (fresh, frozen, and canned) in June 1955 was 103.7 percent of the 1947-49 average (see table)--5.7 percent higher than in May and 6.5 percent above June 1954.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, June 1955 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			June 1955	May 1955	June 1955	May 1955	Apr. 1955	June 1954
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					103.7	98.1	98.7	97.4
Fresh & Frozen Fishery Products:					107.4	97.9	98.1	98.8
Drawn, Dressed, or Whole Finfish:					101.3	85.6	89.1	98.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.09	.06	87.5	57.6	64.2	59.8
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.24	.22	74.3	68.1	68.1	100.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.58	.50	129.2	111.8	112.4	140.5
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.49	.57	120.2	141.3	179.7	105.4
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.68	.73	136.5	146.6	151.6	91.0
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.53	.47	107.6	96.3	141.4	99.4
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.44	.40	103.8	93.8	64.5	89.1
Processed, Fresh (Fish & Shellfish):					111.6	108.5	105.2	100.7
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.32	.25	107.2	85.1	88.5	74.8
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.71	.69	111.4	108.6	101.1	94.8
Oysters, shucked, standards	Norfolk	gal.	4.63	4.63	114.4	114.4	114.4	114.4
Processed, Frozen (Fish & Shellfish):					103.2	95.6	95.3	97.6
Fillets: Flounder (yellowtail), skinless, 1-lb. pkg.	Boston	lb.	.39	.38	106.1	99.5	110.0	100.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.26	.26	81.6	80.0	86.3	100.4
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	106.7	106.7	111.8	116.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.67	.59	103.4	91.0	84.1	84.1
Canned Fishery Products:					98.3	98.3	99.4	95.4
Salmon, pink, No. 1 tall (16 oz.), 48 can/cs.	Seattle	case	10.70	20.70	109.6	109.6	109.6	99.1
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans cs.	Los Angeles	case	12.50	12.50	90.1	90.1	91.6	95.5
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	case	7.55	7.55	88.1	88.1	85.2	2/
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	case	6.70	6.70	71.3	71.3	76.6	74.0

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.
2/Not available.

Ex-vessel prices for large dressed haddock at Boston, and prices of western halibut and salmon at New York were up, causing a substantial increase (18.3 percent) in the drawn, dressed, or whole finfish subgroup index from May to June. Haddock landings at Boston were light due to a tie-up of part of the offshore fleet. The June 1955 prices for lake trout and yellow pike were higher than in May while whitefish prices were considerably lower. Compared with June 1954, prices for haddock and the fresh-water varieties were considerably higher, and prices for halibut and salmon were lower.


A box of fluke sorted immediately after landing at the dock of a wholesale plant in Hampton, Va.

Higher prices also prevailed for the fresh processed fish and shellfish subgroup. Lighter production caused an increase in prices from May to June for fresh haddock fillets and shrimp. The over-all June index for the subgroup was 2.9 percent higher than in May. The June 1955 index for the fresh processed fish and shellfish subgroup was 10.8 percent higher than a year earlier, with shrimp and haddock fillet prices up and oyster prices unchanged.

The frozen processed fish and shellfish subgroup index increased 7.9 percent from May to June. All items included were priced higher except ocean perch fillets which remained at the May level. When compared with June 1954, frozen fish and shellfish prices in June 1955 were 5.7 percent higher, but the individual items varied--flounder fillets and shrimp prices were higher while prices for fillets of haddock and ocean perch were lower.

All canned fish prices in June were the same as in May. The over-all index for canned fishery products in June 1955 was 98.3 percent of the 1947-49 average, 3.0 percent below a year earlier due to higher salmon prices. Canned tuna and Maine sardine prices were lower in June 1955 than a year ago.

SPARE COPIES OF 1942 "FISHERY MARKET NEWS" AVAILABLE

The Service has available for distribution a limited number of spare copies of some of the 1942 issues (volume 4) of Fishery Market News (the forerunner of Commercial Fisheries Review).

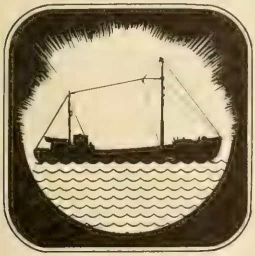
Listed below is one of the articles appearing in each issue available. In addition to the article indicated, each issue contains other news and articles pertaining to the commercial fisheries.

Jan. 1942 - "Pasteurization of Crab Meat - Part I"
Feb. 1942 - "Pasteurization of Crab Meat - Part II"
Mar. 1942 - "Retailing Fresh Fish in Five Cities of the Upper Ohio River Valley"
May 1942 Supplement - "The Alaskan King Crab"
Nov. 1942 - "Food Production in Farm Fish Ponds"

For these spare copies write the Branch of Commercial Fisheries U. S. Fish and Wildlife Service, Washington 25, D. C. Single issues or a complete set of the issues listed above may be requested. Requests will be filled as received until supplies are exhausted.

International

NORTHWEST ATLANTIC FISHERIES COMMISSION



REGULATION OF NET-MESH SIZE IN SUBAREAS 3 AND 4 AGREED UPON AT OTTAWA MEETING: Acting on the advice of scientific advisers who predict heavier catches will result, the Commission approved the setting of minimum mesh sizes for cod and haddock fishing in Subareas 3 and 4 of the Convention Area (excepting territorial waters) where at present free fishing prevails. For Subarea 3, which takes in the Newfoundland banks and adjacent waters, the Commission recommended a 4-inch minimum mesh size, while a $4\frac{1}{2}$-inch mesh size was recommended for Subarea 4 which covers the Nova Scotian waters with the Gulf of St. Lawrence and the Bay of Fundy. The $4\frac{1}{2}$-inch mesh size in Subarea 4 will become effective in 1956 provided approval is granted by member nations. The recommendation for different mesh sizes in the two areas is based on biological evidence which shows that the species grow more slowly and mature later in the more northerly Subarea 3. This agreement to regulate mesh sizes in subareas 3 and 4 was the highlight of the Fifth Annual Meeting of the International Commission for the Northwest Atlantic Fisheries at Ottawa early in June.

Up to the present, the only fishing grounds in the Convention Area subject to mesh size regulations are Georges Bank and the Gulf of Maine located in Subarea 5, where a $4\frac{1}{2}$-inch mesh regulation has been in effect since July 1, 1953. This regulation applies only to haddock, but the Commission approved an amendment to make it applicable to cod as well. In order to avoid impairment of fisheries conducted primarily for species other than cod and haddock, the regulations, both proposed and in effect, permit the use of smaller mesh nets in all three subareas when fishing for species other than haddock and cod. A specified amount of cod and haddock taken incidentally in fishing for other species may be legally retained. Landings of all species from Subarea 5 last year amounted to 154,649 metric tons, from Subarea 4 around 300,000 metric tons, and from Subarea 3 approximately 500,000 metric tons.

Captain Tavares de Almeida of Lisbon, Portuguese Commissioner, on the international Commission for the Northwest Atlantic Fisheries, was elected Chairman for 1955, at the conclusion of the meeting on June 11. He succeeds Dr. Stewart Bates, who relinquishes the chairmanship after a two-year term. K. Sunnanaa, Norwegian Commissioner from Bergen, was elected Vice Chairman, a post previously held by Almeida. Officers elected to head the Standing Committees are: Standing Committee on Research and Statistics, Dr. Lionel A. Walford, Chief, Branch of Fishery Biology, U. S. Fish and Wildlife Service, Washington, D. C.; Standing Committee on Finance and Administration, J. Howard MacKichan, Halifax, N. S. Panel Chairmen are: Panel 1, B. Dinesen, Under Secretary, Ministry of Fisheries, Copenhagen; Panel 2, Commander H. F. Barbier, Representative of the French Merchant Marine in the United States and Canada; Panel 3, C. L. Chicheri, Commercial Attache, Spanish Embassy, Ottawa; Panel 4, J. Howard MacKichan, Halifax, N. S.; and Panel 5, F. W. Sargent, Director, Division of Marine Fisheries, Department of Conservation, Boston, Mass.

The European representatives urged that a meeting of the Commissioners be held in Europe and it was agreed to do so in 1957. Portugal has already extended an invitation for the Commission to meet in Lisbon.

TERRITORIAL WATERS

CHILE, PERU, AND ECUADOR REAFFIRM PRINCIPLES OF 200-MILE TERRITORIAL WATERS ZONE: Representatives of Chile, Ecuador, and Peru met for two weeks in Santiago (meetings ended May 30) relative to a reply of the three governments to a proposal made by the United States on problems deriving from the declaration on a 200-mile territorial waters zone established in the agreement of Santiago of 1952. A communique released May 30 states that the representatives of the three countries acted on the basis of a complete unanimity of criterion reaffirming the principles of the tripartite declaration and agreed on the text of a reply which was scheduled to be delivered to the United States Government. The agreements reached were incorporated in the Act, which was signed by the representatives of each of the three countries, a May 30 U. S. Embassy dispatch from Santiago points out.

An item in the Peruvian press (*La Prensa*, Lima, May 25), indicates that Chile, Peru, and Ecuador have agreed to decline to submit the juridical aspects of the 200-mile claim to the World Court, but that they are agreeable to negotiating a conservation convention with the United States, provided they can reserve their position regarding maritime jurisdiction.

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200-MILE TERRITORIAL WATERS ZONE RATIFIED: The Peruvian Congress on May 5 ratified six conventions signed on December 4, 1954, by Peru, Chile, and Ecuador concerning fishing and the 200-mile territorial waters zone, a May 6 U. S. Embassy dispatch from Lima reports. At the same time Congressional approval was given similar conventions signed at the first conference on exploitation and conservation of resources of the South Pacific held at Santiago, Chile.

Australia

JAPANESE CANNED TUNA OFFERED IN AUSTRALIA CHEAPER THAN AUSTRALIAN PRODUCT: Japanese tuna (fancy light meat in cottonseed oil) was offered in Sydney in April at reported prices of 12s. 9d. (US$1.43) and 13s. 6d. (US$1.51) per dozen cans wholesale for $3\frac{1}{2}$-oz. cans and 22s. 3d. (US$2.49) for 7-oz. cans. Corresponding prices of Australian canned tuna are 19s. 3d. (US$2.16) and 26s. 9d. (US$3.00), respectively.

Adding the usual retail mark-up, the Japanese product which wholesales at 12s. 9d. (US$1.31) a dozen $3\frac{1}{2}$-oz. cans would probably retail for about 1s. 9d. (20 U. S. cents) a can.

Australian canners could not hope to compete with such prices which are made possible by Japan's low-wage economy. If sufficient Japanese tuna were imported it would kill the young Australian tuna canning industry and might even affect other Australian canned fish as well. It is understood that fish canners are approaching the Dept. of Trade and Customs for protection, the May 1955 *Fisheries Newsletter* of the Commonwealth of Fisheries points out.

The import position is affected by the cuts which came into force on April 1. Quota imports have been reduced by 15 percent (value) of the base year (1950-51). But any importer who used to hold sterling and Japanese quotas for any particular item can now devote both to importing that item from Japan.

On the application of the Fish Canners' Association of Australia, the Tariff Board has had referred to it for investigation the question of what rates of duty should be imposed on fish imported in tins or other airtight containers which is classifiable under Items 51c (1) and 51c (4). The first affects salmon and the second fish other than salmon (and crustaceans). The second would therefore cover tuna. The dates of the public hearings of this application have not been announced.

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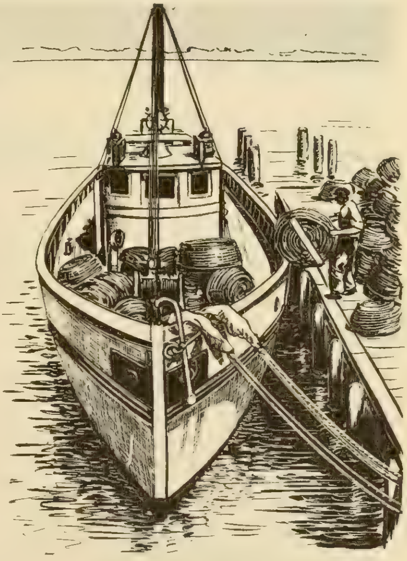
SPINY LOBSTER INDUSTRY, 1953/54: Production: The spiny lobster catch in Australia during the 1953/54 season (July 1 to June 30) totaled 17,094,400 pounds (weight in the shell), reports the October 1954 *Fisheries Newsletter* of the Commonwealth Director of Fisheries (table 1). The large increase in production in Victoria brought the catch in that State to over one million pounds for the first time. However, no spiny lobsters are exported from either Victoria or New South Wales since spiny lobsters command high prices on the Melbourne and Sydney markets.

Table 1 - Australian Spiny Lobster (Crayfish) Catch by States, 1952/53 and 1953/54[1]

State	1953/54	1952/53
	Lbs.[2]	Lbs.[2]
Western Australia	9,137,500	8,098,602
Tasmania	2,350,000	2,744,390
South Australia	3,850,000	3,500,000
New South Wales	563,000	528,000
Victoria	1,193,900	755,568
Total.	17,094,400	15,626,560

[1] Fiscal year July 1 to June 30.
[2] Round weight (landed weight).



Australian spiny lobster fishing boat taking on pots of South Fremantle.

Exports: The bulk of the Australian spiny lobster production is exported and in 1953/54 an estimated 13 million pounds of the total was packed for this market. The United States is the leading buyer and in 1953/54 received 98 percent of the total exports, nearly all in the form of frozen tails. The total exports in 1953/54 amounted to 4,168,600 pounds of tails and 65,738 pounds of whole spiny lobsters, valued at £1.6 million (US$3.5 million), as compared with the previous year's total of 3,941,368 and 130,029 pounds, respectively, valued at £1.4 million (US$3.2 million). In 1953/54, a total of 3,672 pounds of frozen spiny-lobster meat was also reported.

The most important feature of the Australian spiny lobster industry is its contribution to dollar earnings. In the 1953/54 season the industry earned US$3.5 million as compared with US$3.2 million the previous year and US$1 million in 1948/49.

During the 1953/54 year export prices showed a tendency to level off at an average of about 7s.4d. to 7s.6d. (82-84 U. S. cents) per pound. The highest ascertained

Fishermen haul up a lobster pot into their cutter. Catches are variable, depending on the state of the sea. They're light when turbulent water keeps the lobsters in their crevices or clinging to the rocky bed; good when they're crawling on the seabed foraging for food.

price was 7s. 10d. (88 U. S. cents) and the lowest 6s. 10d. (77 U. S. cents) per pound, the latter presumably for an all-midget consignment.

Tasmania and South Australia produce the southern spiny lobster (Jasus lalandi) which is the same species as exported by South Africa and New Zealand. But Western Australia has the western spiny lobster (Panulirus longipes) which, though not less enjoyable than the southern species, has yielded a greater proportion of very small sizes (midgets). The United States market likes the medium sizes best. With the very large sizes, a method of splitting the tail lengthwise has been adopted in some cases which has tended partly to overcome the difficulty of disposing of the bigger tails. It is the midget and small sizes which are worrying American traders, according to Australian sources.

New Zealand has adopted size restrictions intended to eliminate midgets.

During the last few years, the prices brought by Australian spiny-lobster tails mounted, but in 1953/54 they steadied. To a large extent, prices of competitive food products such as meat and shrimp, affect the prices which can be obtained for spiny lobsters.

Table 2 - Australian Spiny Lobster (Tails and Whole) Exports by Country of Destination and State of Origin, 1952/53 and 1953/54

State	1953/54		1952/53	
	Quantity		Quantity	
	Tails	Whole	Tails	Whole
	Lbs.	Lbs.	Lbs.	Lbs.
By Country of Destination:				
United States	4,159,860	3,125	3,921,558	49,907
Hawaii	4,240	1,015	605	-
Canada	1,000	230	11,455	61,266
Singapore	3,375	61,308	7,750	18,856
Other	125	60	-	-
Total	4,168,600	65,738	3,941,368	130,029
By State of Origin:				
Tasmania.	97,630	3,960	161,715	77,347
South Australia	827,535	260	956,475	33,826
Western Australia	3,243,635	61,518	2,823,178	18,856
Total	4,168,600	65,738	3,941,368	130,029

Note: Also see Commercial Fisheries Review, March 1953, p. 37.

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WESTERN AUSTRALIAN SPINY LOBSTER CATCH AT RECORD HIGH: Record catches of spiny lobsters are being reported at Abrolhos Islands, Western Australia, since the fishing season commenced on March 15, reports The Fishing News (May 20), a British fishery publication. Spiny lobsters are being found in greater numbers than ever before and generally fishermen are bringing in larger catches per unit than previously.

This season 168 men and 104 vessels are operating in the area, compared with 139 men and 85 craft last year.

The State's chief spiny lobster exporter is endeavoring to establish outlets in Denmark, Germany, and other Continental countries, and to this end recently dispatched samples of cooked spiny lobster to test the markets. Determined efforts are also being made to boost the present substantial exports to the United States.

Canada

LABELING REQUIREMENTS FOR IMPORTED FISHERY PRODUCTS: The specific law relating to the marking of containers of fish and shellfish imported into Canada, according to recent correspondence from the Canadian Department of Fisheries' Director of Inspection and Consumer Service, requires that the label bear the following information:

1. Kind, grade, and weight of fish (or shellfish).
2. Name and country of origin.
3. Name and address of the packer.

For the purposes of administration, the Department has ruled that on labels of fish sticks and other processed fish the vernacular name of the fish and the minimum net weight of the contents be in lettering and numbering not less than $\frac{3}{16}$ inch in height on the main body of the label.

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BRITISH COLUMBIA MIDWATER HERRING TRAWL TESTS SUCCESSFUL: Encouraging herring catches have been reported on preliminary field trials in waters off the coast of British Columbia of a midwater trawl being developed by the Fisheries Research Board of Canada.

Numerous successful night sets have been made on schools of herring in the lower Strait of Georgia. (Purse seining near the surface is the usual method of catching herring.) Catches of herring ranging from 10 to 30 tons per drag were made in midwater at depths of from 15 to 20 fathoms, reports the February Trade News of the Canadian Department of Fisheries.

The midwater-trawl development is being undertaken to test and adapt to British Columbia conditions an efficient alternative method for catching herring and other species. The project was requested by certain segments of the British Columbia fishing industry, and the work is being carried out by the Fisheries Research Board for the Industrial Development Service responsible for projects undertaken by the Federal Department of Fisheries to bring about new and improved production and processing techniques in the fisheries of Canada.

Operating from the chartered otter trawler Sea Pride II, the experimental fishing is being done with a trawl net made almost entirely of nylon. The trawl net with its specially-constructed otter boards was specially designed by an experienced Vancouver herring fisherman.

It is believed that the development of a successful midwater trawl could open a new field of operation for trawl fishermen in British Columbia in that they would be able to catch herring at times when they have normally been unavailable.

To complete the research, further tests were planned for this summer off the west coast of Vancouver Island.

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QUEBEC RAISES MINIMUM SIZE OF LOBSTERS FOR CANNING: The minimum size of lobsters for canning to be caught by Quebec lobstermen has been raised from

$2\frac{5}{8}$ inches to $2\frac{3}{4}$ inches carapace measure by the Federal Department of Fisheries at the request of the Quebec government.

Biologists have discovered that the larger lobster has a greater meat yield, and as a result brings higher returns to the fishermen. It is expected that through the increased minimum size limit in areas 9 and 10, the Quebec fishermen will capitalize on the resulting increased stocks of larger lobsters. The $2\frac{5}{8}$-inch lobsters, which are caught legally in all other Maritime canner-size lobster fishing areas, will in Quebec waters be allowed their freedom to grow larger, heavier, and more profitable.

Areas 9 and 10 in Quebec include the waters of the north and south shore of the Gulf of St. Lawrence, the Gaspe Peninsula, and the Magdalen Islands.

Carapace measure means the measurement from the rear of either eye socket along a line parallel to the center line of the body of the rear end of the body shell.

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COMMERCIAL ATLANTIC SALMON SEASON IN NEWFOUNDLAND: An opening date was set for the beginning of commercial fishing for Atlantic salmon in Newfoundland for the first time since the Confederation, reports the April 1955 Trade News of the Canadian Department of Fisheries. Regulations passed by the Federal Department of Fisheries set the opening date in Newfoundland for commercial salmon fishing for May 15, except in the waters from Cape St. George to Pass Island where the opening date was set for May 5.

The setting of opening dates for commercial salmon fishing in Newfoundland is in keeping with that Province's desire to make a contribution to the program of the Atlantic Salmon Co-ordinating Committee designed to increase stocks of Atlantic salmon for both the angler and commercial fishermen.

Atlantic salmon angling in Newfoundland opened as usual on May 24 with a daily bag limit of six salmon in all areas and a weekly limit of 21 salmon.

Denmark

SAND LAUNCE USED FOR FISH MEAL: A Danish fish which heretofore has been considered of little value has recently become important in the production of fish meal, according to Dansk Fiskeritidende (May 20), a Danish fishery periodical. The fish is the sand launce (Ammodytidae), which previously has been used as bait. Now it has been found to be well adapted to the production of fish meal and several hundred tons have been purchased by fish-meal plants. It has provided a welcome supplement to other raw materials and has brought the fishermen 8 to 10 øre per kilo (0.5-0.7 U. S. cents per pound). Many boats on the west coast of Jutland have had catches of up to 400 boxes after one or two days of fishing.

Sand Launce
(Ammodytes lanceolatus)

Dominican Republic

COMMERCIAL FISHING INDUSTRY STARTED: A company has been formed to initiate a commercial fishing industry in Dominican Republic waters, a U.S. Embassy dispatch (June 8) from Ciudad Trujillo points out. Equipped with 2 or 3 small boats, the firm will begin operations by fishing for spiny lobsters, shrimp, and tuna, both for domestic consumption and export to the United States. If conditions prove favorable it may expand to include canning and other fish-processing industries.

Ecuador

FOREIGN VESSELS REQUIRE LICENSE TO FISH WITHIN 200-MILE ZONE: The Government of Ecuador has announced the opening of its territorial waters (up to 200 miles) to foreign fishermen obtaining licenses, according to the Quito press (*El Comercio*, May 8). The Decree (No. 955-A) was signed April 29, a U. S. Embassy dispatch (May 9) from Quito reports, and reads as follows:

"Article 1. With the exception of species known as cabrilla of cod, shrimp, crayfish and lobsters, vessels of foreign registry shall be permitted to engage in commercial fishing for marine species in Ecuadoran territorial waters, both continental and insular, which for the purpose of maritime fishing and hunting in general, shall be considered in a zone within 200 nautical miles measured from the lowest tide line, following the irregularities of the continental coast, and that within 200 nautical miles measured from the lowest tide line at the most salient points forming the contours of the Conlon Archipelago, without prejudice to the said extension being modified by any subsequent determination of what is understood as the territorial waters of the Republic.

"Article 2. The authority granted in the previous article to vessels of foreign registry shall be limited to a zone of 1,000 meters seaward along the continental coast from the Colombian border to the town of Playas; from there this limit will follow a straight line to the island of Santa Clara or El Muerto, and thence another straight line to Boca Capones on the Peruvian border.

"Article 3. Bait fishing shall be prohibited to foreign national vessels in a maritime zone extending 1,000 meters along the coastline at either end of the coastal villages, and 1,000 meters seaward measured from the shore. This prohibition shall not apply to domestic fishermen.

"Article 4. The prohibition contained in Article 1 of Executive Decree No. 0160 of January 29, 1952 is hereby rescinded, as well as any other executive decree or regulation contrary to the provisions of the present decree, with the limitations that have been established.

"Article 5. The Ministers of Economy, National Defense, Foreign Relations, and Treasury shall be charged with carrying out the present decree, which will enter into force upon its promulgation."

On May 14, 1955, the President of Ecuador signed Executive Decree No. 1085 which defines the scope of Decree No. 955-A, reports a May 17 U. S. Embassy dispatch from Quito.

The new decree provides for two principal additions to Decree No. 955-A. The first of these consists of the introduction of language to make it very clear and explicit that foreign-flag fishing vessels must first obtain the necessary fishing permits and registrations (matriculas) before they will be permitted to fish within continental territorial waters as defined by the Ecuadoran Government pursuant to the Declaration of Santiago. Decree No. 955-A, although it did not explicitly mention the need for obtaining fishing permits, did not in any way eliminate the necessity for foreign-flag fishing vessels to obtain such permits. Article 1 of the new decree explicitly refers to this need.

The other main modification involves the addition of a provision prohibiting whaling. Article 2 of the new decree provides that fishing permits granted for operations in Ecuadoran territorial waters shall not confer the right to hunt for whales after the agreement signed in Lima in December 1954 entitled "Agreement Concerning the Granting of Permits for the Exploitation of the Riches of the Southern Pacific" has entered into force.

German Federal Republic

MARINE-OIL INDUSTRY, 1954: Production: Total production of marine oils in West Germany in 1954 amounted to 31,700 metric tons of raw oil (all herring oil), as compared with 32,700 tons of raw herring oil in 1953. This decline was due primarily to an increased demand for herring for edible purposes. The estimated future annual production of herring oil continues at 27,300 metric tons of raw fish oil, reports a May 24 U. S. Embassy dispatch from Bonn.

Imports: West German imports of marine oils in 1954 totaled 231,800 metric tons (value DM190.5 million or US$45.3 million), consisting of cod-liver oil 1,200 tons (value DM1.4 million or US$330,000), whale fat and oil 121,400 tons (value DM102.8 million or US$24.5 million), and other marine fats and oils 109,200 tons (value DM83.6 million or US$20.5 million). The bulk of the 1954 imports was utilized for food purposes. The 1953 imports totaled 203,600 tons--cod-liver oil 400 tons, whale fat and oil 120,500 tons, and other marine fats and oils 82,700 tons.

The United States was the leading supplier of other marine fats and oils (excluding whale fat and oil and cod-liver oil), shipping 34,000 metric tons (value DM26.8 million or US$6.4 million), followed by Netherlands 22,000 tons (value DM17.1 million or US$4.1 million), Great Britain 12,700 tons (value DM10.0 million or US$2.4 million), Norway 10,000 tons (value DM8.7 million or US$2.1 million), and Portuguese West Africa 9,000 tons (value DM6.7 million or US$1.6 million). However, of the 1954 imports from the United States, only 9,800 metric tons were purchased direct. The United States was the leading shipper of other marine fats and oils to West Germany in 1953 also, supplying 32,000 tons. Japan and Norway were the leading suppliers of whale fat and oil in 1953 and 1954, respectively.

Among the changes in duties and nomenclature affecting West German's import tariff classifications on oils and fats put into effect as of April 1955 were the following:

1. Under the Tariff Number 1507 was inserted the footnote "raw oils under this number, inedible, or made unfit for human consumption under customs supervision, or for processing in the chemical or pharmaceutical industry under customs supervision - free of duty."

2. Under the Tariff Number 1512 was inserted the footnote "hardened whale oil and hardened fish oil for the production of margarine, shortenings or other finished edible fats under customs supervision - 2% ad valorem."

The fats and oil items added to the dollar liberalization list by West Germany include the following:

Customs Tariff No.	Commodity
1504: 10	Raw cod-liver oil
21	Purified medical cod-liver oil
29	Purified other cod-liver oil
53	Sperm whale oil for industrial purposes
60	Fish-liver oil (excl. cod-liver oil) for industrial purposes

Exports: West German exports of marine fats and oils in 1954 totaled 7,600 metric tons, consisting of 1,500 tons of cod-liver oil, 700 tons of whale fat and oil, and 5,400 tons of other marine fats and oils.

Wholesale Prices, April 1955: The wholesale purchase price of fish oil in Hamburg at the end of April 1955 was DM116-117 per 100 kilos (12.5-12.6 U. S. cents per pound), and the whale-oil price was DM121-122 per 100 kilos (13.1-13.2 U. S. cents per pound).

Greece

FROZEN FISH CONSUMPTION INCREASING: There was a noticeable increase in the consumption of frozen fish in the Athens-Piraeus markets of Greece during 1954 and the first four months of 1955, reports Aleia (April-May 1955), a Greek fishing periodical. Greek consumers are gradually getting accustomed to frozen fish.

The vessel Evridiki which fishes off the northwest coast of Africa recently delivered 120 metric tons of frozen fish caught on a two-months' trip. An Athens fishery cooperative has contracted with a French fishing firm in Casablanca to deliver approximately 40 tons of frozen fish every 45 days.

Iceland

NEW FISH-PROCESSING PLANTS: Two new fish-processing plants are under planning and construction in Iceland, reports a May 26 U. S. Legation dispatch from Reykjavik.

A new fish-freezing plant, begun in 1954, is scheduled to be completed in about a year and a half at Seydisfjordur on the East coast. The Development Bank of Iceland has granted a 15-year loan of IKr. 1.8 million (US$110,000) to complete the construction on which IKr. 1.9 million (US$116,000) has already been spent in the past.

The Icelandic press reports that a freezing plant capable of producing 24 metric tons of fish fillets per day and having a storage capacity for 1,200 tons of frozen fish and 260 tons of ice is to be built at Akureyri. The Development Bank has granted the Akureyri Trawler Company IKr. 3.5 million (US$214,000) for expenditure during 1957-59 for partial repayment of a German loan of IKr. 6 million (US$368,000) now being negotiated. Sales of stock have thus far brought in IKr. 1.2 million (US$735,000).

These plants will not add greatly to Iceland's total capacity but they are important locally since they provide employment and cut down the transit time of locally-owned fishing vessels.

India

STATUS OF THE FISHERIES: Consumption of fisheries products in India is only about 5 pounds per person per year as compared with 70 pounds in Burma and about 20 pounds in Ceylon, states a U. S. Foreign Operations Administration dispatch

(May 19) from New Delhi. The improvement of fisheries in India is needed as a means of increasing food production and improving the nutritional value of the Indian diet.

Only a fraction of India's water area of 15 million acres under rivers, lakes, etc., has been utilized for fishing. At a number of important fishing areas, especially along the west coast where India's largest fisheries are located, fishing is hampered by obstructed harbor entrances. Proper dredging of such harbors would increase productive fishing time by about 25 percent. Experimental fishing in the Bay of Bengal, and some distance from the west coast of India, by larger types of craft such as are used in American, European, and Japanese fisheries, has shown that there is a rich variety of commercial species of fish only partially exploited.

A large proportion of the vessels are propelled only by sail and oars. They are limited to fishing grounds within a few miles offshore and must spend considerable time in going to and from these grounds which would otherwise be spent in productive fishing. Consequently, production is very low. Mechanization of such craft as are suitable for this purpose and replacing others by small motorboats will increase the productive fishing time and enable the fishermen to reach offshore waters presently inaccessible to them.

Efficient marketing is of great importance for the development of fisheries and the improvement of the lot of fishermen. Most of the fresh-water fish is marketed and consumed fresh. On the other hand, only 20 percent of the sea-fish catch is marketed fresh and the remaining 80 percent is either preserved as sun-dried fish or as salted fish, or converted into fish meal and fertilizer. Increased marketing of sea fish as fresh fish is necessary not only to meet the large unsatisfied demand for fresh fish but also in the interest of the small fisherman who receives a higher price for fresh fish. However, there are problems of rapid transport, cold storage, and supply of ice which must be met if the catch is to be marketed fresh.

INDO-AMERICAN FISHERIES PROGRAM: The need for substantial improvement in the fisheries industry of India is recognized by the Government of India. The first Five Year Plan emphasizes the development potentialities of several aspects of the industry. These are in the fields of vessel mechanization, harbor clearance, fishing requisition, cold storage, land transport, offshore fishing, and training facilities.

The Indo-American program has provided assistance in each of these areas. The 1953 agreement stressed marine fisheries development and the 1954 agreement provided equipment to develop inland fisheries.

Under the 1952 agreement the Indo-American program provided 140 small Diesel engines for the use of Indian fishermen on the west coast. Some of the engines were installed in boats for demonstration purposes in order to instruct Indian fishermen, but most of them were sold below cost on a four-year credit basis to fishermen and cooperatives through the agency of the State Governments. With mechanized vessels, Indian fishermen have been able to almost triple the catch formerly made with old sailing vessels; from the increased earnings, Indian fishermen are able to make payment for the engines over the four-year credit period. In the future an increase in the number of mechanized boats should be possible from the increased earnings. The 1954 Indo-American agreement provided 115 additional Diesel engines and 12 outboard motor engines because of the great improvement provided by the engines under the 1952 program.

Proceeds from the sale of these engines as well as other equipment in the program will be used for other developmental projects in the Indo-American program.

The Indo-American program furnished fishermen fishing hooks, yarn, twine, nylon, and other line in short supply not available in the domestic market. These items are imported under the Indo-American program and sold to fishermen on credit below cost. Indian fishermen are increasing their earnings with the use of these new items, and as in the case of engines, should be able in the future to purchase them without special assistance.

Improvement in marketing of fish is being accomplished by better transportation and storage of the fish so that a greater market may be reached. The Indo-American program has provided ice and cold-storage plants in order to furnish the larger fishing villages and other centers of distribution with adequate facilities for the preservation of fresh fish. In addition, nine insulated road vans were provided for improving transportation of fresh fish from fishing villages to centers of distribution and consumption within a radius of approximately 60 miles. This equipment was provided under the 1952 agreement; additional equipment of similar type for the same purpose will be provided under the 1954 agreement.

The promotion of offshore fishing, including the introduction of mothership operations, is another facet of the Indo-American program. This has provided a number of vessels fully equipped for exploratory and experimental fishing as well as for the training of Indian fishermen in the use of such craft and equipment. The vessels provided under the 1952 agreement include 30- to 40-foot multipurpose fishing boats of various designs, the 45-foot vessels for use as motherships, and 3 100-ton Japanese bull trawlers. Also under the program, the 2 existing trawlers were renovated and equipped with modern facilities.

The two vessels to be used as motherships are for towing small fishing craft to fishing grounds which they cannot reach under their own limited power, thus increasing their range of operations. Each of the vessels can tow about 15 small boats and has insulated space for carrying ice and storing catches.

The Indo-American program has financed the conversion of two Indian Government-operated trawlers into paired bull-trawl fishing vessels. Prior to conversion the catch of these two vessels was very low. After conversion with the help of three Japanese technicians (financed by the Indo-American program) on each vessel, the catch has increased considerably. In November 1954 the Japanese technicians, including a master, mate, and engineer, returned to Japan and the vessels were turned over to Indian crews. The catch under Indian crews has been extremely good and record catches were obtained. As an example, 54 metric tons were obtained in 12 days, or 27 tons per vessel. This is 4 times the catch made prior to the conversion of the vessels.

The provision of adequate training facilities for Indian fishermen is another phase of the program which has assisted the Government of India and the states concerned in establishing a number of training centers to teach Indian fishermen improved fishing methods. These centers are utilizing some of the equipment furnished under the program. Full advantage is also being taken of the training facilities offered by the Food and Agricultural Organization.

Although the major results of the program are still to be realized, the immediate effects have been considerable. The almost three-fold increase in the catch of small boats after mechanization as compared to the previous catch is an important indication of the value of this facet of the program. In the field of larger fishing vessels, the demonstration program has already begun to have wider effects. Not only has the catch of converted bull trawlers been substantially increased under Indian crews as well as Japanese crews, but private capital has been attracted into the field. The former director of fisheries at Bombay, with other Bombay residents, formed an Indo-Japanese fisheries company with 51 percent Indian capital to import four bull-trawl vessels for private fishing operations. This increase in the investment of private capital in the industry is one of the important indications that the Indo-American program is succeeding in the demonstration phase of its work.

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Japan

CANNED TUNA MOVEMENT TO UNITED STATES: Because the various Japanese companies exporting tuna became concerned over the prospect of uncontrolled marketing of canned tuna in the United States, arrangements were made to place their stocks in the joint hands of two large Japanese trading companies for marketing. There were about 600,000 cases of canned tuna in stock in Japan early this year.

The trading companies sent two representatives to New York to survey the market. As a result of this visit, the two trading companies decided upon a schedule of exports from Japan at the rate of 100,000 cases a month for March and April and 150,000 cases a month for May and June.

The actual figures on Japanese exports of canned tuna and bonito to the United States as furnished by the Japanese Customs Bureau (converted to standard cases of 48 7-oz. cans a case) are: January 81,398 cases, February 87,811 cases, and March 105,580 cases.

Customs figures are not available as yet for April but the amount given by the exporters is 108,714 actual cases. The f.o.b. price of canned albacore tuna in brine was quoted in May as US$9.55 per standard case of 48 7-oz. cans, states a May 31 U. S. Embassy dispatch from Tokyo.

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COOPERATIVE SALES ASSOCIATION TO ALLOCATE FROZEN TUNA EXPORTS: A Japanese cooperative sales association (Kyohankai) to handle the export of frozen tuna has been established by the Japanese Frozen Food Export Association with Japanese Government consent, reports a June 3 U. S. Embassy dispatch from Tokyo.

Decreased demand, coupled with recent good catches, has depressed the Japanese market price of frozen tuna to US$240 or US$250 per ton, far below the export check price of US$300 per ton, and industry and government circles apparently feel that drastic action is necessary to prevent circumvention of the check-price system and adverse criticism from the United States tuna industry. The establishment of such a sales organization is possible under the Marine Products Industries Law.

The purpose of the cooperative sales organization is to maintain the check price, stabilize the United States tuna market, and strengthen Japan's tuna export position. The organization will be responsible for all exports of frozen albacore tuna, the species which forms the bulk of frozen tuna exports to the United States, with allocations of business to the participating firms being made on the basis of their share of the market during the most favorable two-year period during the last three years. A proposal to allow the sales organization to assign orders to firms designated by the foreign buyer was deleted from the plan on the grounds that this would open the door to collusion between buyer and supplier to get around the check-price system.

A new scale of check-price levels was also established by the Frozen Food Export Association as follows: albacore tuna US$270; yellowfin tuna US$230; skipjack tuna US$190 a short ton.

The plan provides for the export of 10,000 metric tons of frozen albacore tuna from June 1 to July 31, with approximately 5,000 tons which were already warehoused by May 31 to be handled outside of this limitation.

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EXPORT POLICIES REVISED: Two recent actions were taken by the Japanese Government which may affect that country's exports, according to Economic Developments In Japan, 1954, a U. S. Department of Commerce publication.

One of the most important factors contributing to the expansion of Japanese exports was the use of export promotion measures such as the "link system" processing and barter transactions, and the export-retention system. Such special measures were put into effect for the specific purpose of making Japanese exports more competitive in foreign markets.

The link system consisted of two practices: (1) the linking of raw material imports and exports of manufactured products, and (2) the compensating link, whereby an exporter of an unprofitable item such as a ship was compensated for below-cost prices by an import license for an especially profitable item such as sugar. It has been estimated that at least 20 percent of Japan's 1954 exports were affected by the use of such practices as the link system, the foreign-exchange retention system, and barter trade. The Japanese Government has announced that use of the compensatory link system would be discontinued after March 31, 1955.

The Japanese Government also announced that the amount of foreign exchange which may be retained by an exporter as an export incentive would be reduced as of March 1, 1955, from 10 percent to 5 percent of his export proceeds. Such funds retained by an exporter are used for imports of specified raw materials, travel, expenses of oversea branches, and other specified purposes.

The U. S. Department of Commerce states that in 1954 Japanese trade agreements were in effect with 24 countries, of which 14 were in the open-account area, 4 in the sterling area, and 6 in the dollar-cash-settlement area. However, the trade deficit with the United States in 1954 rose 8 percent over 1953, from US$523 million to US$567 million.

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FISHERIES TRAINING VESSEL TO SAIL FOR NORTH PACIFIC: The Japanese fisheries training vessel Oshoro Maru, with a crew including 35 fisheries cadets from the University of Hokkaido and 6 scientists, was due to depart from Hakodate on June 15, for a training and research cruise in North Pacific waters, a May 31 U. S. Embassy dispatch from Tokyo states. During the period June 25-July 15, the vessel will be engaged in making oceanographic observation in correlation with investigations being made during the same period by the Scripps Institution of Oceanography, the University of Washington's Department of Oceanography, the Pacific Oceanographic Group of Nanaimo, B. C., and the U. S. Fish and Wildlife Service.

The Oshoro Maru is a motor vessel of 617 gross tons used by the Ministry of Education for the training of fisheries cadets and presently attached to the University of Hokkaido.

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"FISH SHELTERS" TO IMPROVE INLAND SEA FISHING: "Fish apartment houses" is the term used to describe the hollow concrete blocks which the Hyogo Prefectural Government is lowering to the bottom of Japan's Inland Sea in a move to increase the fish population and thus help commercial fishing. The Inland Sea fishing grounds are an important source of food for southern Japan, but have never fully recovered from the serious depletion caused by the intensive wartime fishing, states a May 12 U. S. Consular dispatch from Kobe.

The concrete forms are being sunk in selected spots in and near the channel between Awaji Island and the mainland and will serve to obstruct and hinder the currents along the bottom and thus afford shelter for bottom fish and a breeding ground for plankton and other marine life on which fish feed. The blocks, 4x4x5$\frac{1}{2}$ feet, have windowlike openings on all sides and top, and are being sunk in 16 groups of 80 units each, making a total of 1,280 blocks. Total cost is estimated at approximately 9 million yen (US$27,000).

Prefectural officials, basing their expectations on experiments conducted in Osaka last year, estimate that the catch of bottom fish (bream, perch, bass, sand ell, and octopus) off Awaji will increase 20-30 percent in two years because of the blocks.

Artist's conception of Japanese "Fish Shelters".

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EXPERIMENTS WITH FRESH-WATER PEARL OYSTERS: The fresh-water fishery association of Osaka has embarked on a series of experiments in raising pearl oysters in the small- and medium-sized fresh-water irrigation ponds that are so numerous in the Osaka City and Prefecture Area. These tests are designed to find a way to make full use of these ponds, and as a substitute for lost business due to a decline in carp and roach sales, states a June 6 U. S. Consular dispatch from Kobe.

Pearl oysters have been successfully raised in limited numbers in the fresh waters of Lake Biwa near Otsu by the Shiga Prefectural Association in recent years, and it has been reported that the rate of pearl output there compares favorably with the salt-water pearl farms. Temperature and impurity balance are extremely important in oyster culture and the Osaka ponds may not prove to be fit for such use. Should these attempts prove successful, however, the considerable water surface available in suburban Osaka could perhaps be developed into a valuable asset.

Netherlands

FISHERIES CATCH, 1954: The total quantity of fishery products landed in Netherlands fishing ports in 1954 amounted to over 660 million pounds (landed weight), valued at fls. 94.5 million (US$24.9 million) ex-vessel. The totals for 1953 were 682 million pounds, valued at fls. 96 million (US$25.3 million). The slight decline is partly due to very poor weather conditions in December, which made intensive fishing impossible and partly to the ending of the salted herring season at an earlier date than in 1953, according to the February 1955 Holland Fish Trade, a Netherlands fishery periodical.

Fresh Herring Landings: The volume of the production of fresh herring in 1954 set a new record. Never before was a quantity of 120 million pounds brought ashore in one single year. In 1953 landings totalled 114 million pounds. In the years 1930-38, average landings were 55 million pounds; in the years 1947-49, 92 million pounds; and in 1950-52, 88 million pounds. The 1954 increased production resulted from the enormous catches of drift-net luggers in October. The results of the herring trawl fishery by steam and motor trawlers were less favorable.

Although landings of fresh herring were exceptionally high in 1953, owing to the fine October catches, it is most probable that in the coming years the production of fresh herring will be even more voluminous. This expectation is accounted for by more modern-equipped vessels, with echo-sounders, fish finders, etc., and more powerful engines.

As hauls become larger crews will lack the time to salt the herring aboard the vessels. Moreover, it is not quite impossible that with shrinking outlets for salted herring, the luggers will land more herring in a fresh condition. In 1954 the abundant landings could be cleared thanks to a demand three times that of 1953, particularly from West Germany. The canneries packed more than 33 million pounds as against 42 million pounds in 1953.

Purchases by the fish-meal industry amounted to 20 million pounds compared with 33 million pounds a year earlier.

Salted Herring Landings: During the 1953 season, prices for salted herring were rather high until November, owing to small supplies. In that month enormous landings occurred, which were taken up at reasonable prices.

In 1954 supplies of salted herring amounted to 208 million pounds, valued at fls. 30 million (US$7.9 million) as compared with 235 million pounds, valued at fls. 34.8 million (US$9.2 million).

Shellfish Landings: As regards crustaceans and molluscs, there was a large increase from 1953 to 1954 in the production of mussels--viz: from 126 to 139 million pounds. This level had not been reached in preceding years. The delivery of oysters rose from 2.6 to 3.1 million pounds.

Shrimp landings were on the same level as in 1953 (9.2 million pounds). However, the ex-vessel price went up from fls. 2.9 to fls. 3.4 million (US$0.8 to 0.9 million).

Other Species: Mackerel landings increased from 24 to 25 million pounds. The production of roundfish rose from 44 to 48.2 million pounds. The increase would undoubtedly have been greater but for the December gales. Practically all roundfish species were higher with the exception of whiting, landings of which dropped from 14.3 to 10.8 million pounds.

Haddock arrivals showed a remarkable increase from 1953 to 1954--from 13 to 19 million pounds. The production of small-sized haddock nearly doubled, the other categories only increased slightly.

Landings of cod went up from 10.3 to 11.2 million pounds. The rise comprised the large- and small-sized cod. Coalfish (pollock) supplies rose from 4 to 5 million pounds. The quantity of flatfish marketed decreased from 51 to 43 million pounds. This large decline in landings was compensated for by a rise in the ex-vessel value caused by a decrease in the supply of small plaice.

Plaice landings reached a total of 25 million pounds as against 33 million pounds in 1953. The production of sole went up from 10.8 to 11.4 million pounds.

Both flounder and dab supplies fell off from 2.0 to 1.5 million pounds respectively, and 3.1 to 2.4 million pounds. The production of turbot (1.5 million pounds) remained unchanged as did that of grill and lemon sole.

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FISH-CANNING INDUSTRY DEVELOPING FAST: The Netherlands fish-canning industry is a relatively young branch of the fisheries, according to the May 1955 Holland Fish Trade. In a country like the Netherlands where for ages, the smoking and marinating industries have been playing an important part in the fisheries, this is a remarkable feature. In the past the fishing industry has never had much trouble finding markets for fresh, salted, or smoked fishery products so that there was no powerful stimulus to look for new preserving possibilities. A few fish canneries operated before World War II, but they were of little significance in the general picture.

Not until the war was this situation radically changed. Imports were cut off and a large number of foodstuffs became very scarce. This scarcity appeared to be the necessary stimulus to give birth to the fish-canning industry, which developed very rapidly. The important question was whether this young industry would be able to maintain itself after the war when it became necessary to compete with long established and renowned foreign industries.

In the first postwar years the industry had to face enormous difficulties such as the shortage of tinplate and the ban on canned fish of Netherlands origin in the home market. However, all these obstacles were overcome. In a few years the Netherlands fish-canning industry has grown into a full-fledged industry of great significance.

Netherlands exports of canned fishery products in 1954 totaled 15,543 metric tons, (see table) valued at 20.8 million guilders (US$5.5 million), as compared with 1953 exports of 16,535 tons, valued at 22.7 million guilders (US$6.0 million). Netherlands canned fishery products were shipped to more than 95 foreign canneries in 1954.

Netherlands Foreign Trade in Canned Fishery Products, 1954 with Comparisons

Item	1954			1953			1952		
	Quantity	Value		Quantity	Value		Quantity	Value	
	Metric Tons	1,000 fl.	US$ 1,000	Metric Tons	1,000 fl.	US$ 1,000	Metric Tons	1,000 fl.	US$ 1,000
Imports:									
Canned fish	2,478	6,596	1,736	1,673	3,478	915	797	2,416	636
Canned crustaceans and shellfish . . .	92	561	148	51	331	87	18	132	35
Total Imports	2,570	7,157	1,884	1,724	3,809	1,002	815	2,548	671
Exports:									
Canned fish	14,531	19,705	5,186	15,599	21,588	5,681	11,592	17,455	4,593
Canned crustaceans and shellfish . . .	1,012	1,046	275	936	1,118	294	742	948	249
Total Exports	15,543	20,751	5,461	16,535	22,706	5,975	12,694	18,403	4,842

Imports of canned fishery products into Netherlands in 1954 totaled 2,570 metric tons, valued at 7.2 million guilders (US$1.9 million), compared with 1,724 metric tons, valued at 3.8 million guilders (US$1.0 million) in 1953.

The principal raw materials for the Netherlands fish-canning industry are herring and mackerel. Of these two herring holds first place. The most important export article is herring in tomato sauce, which is manufactured in very large quantities and shipped to numerous countries. This product is in brisk demand in tropical and subtropical areas and competes well with the popular pilchards in tomato sauce.

Other products which are exported on a large scale are herring in oil, herring in natural juice, kippered herring both in oil and in tomato sauce, mackerel in oil, mackerel fillets in oil, mackerel in tomato sauce, and sprat in oil. This latter product is better known under the Norwegian name "brisling" or "brisling sardines." Moreover, there are special delicacies like smoked salmon and haddock liver. Some factories have specialized in canned mussels which also find their way to foreign countries.

The gross quantity of sea fish and herring canned in 1954 amounted to 21,700 metric tons, in addition to 145 tons of fresh-water fish and 2,587 tons of shellfish and crustaceans.

In view of the severe competition of foreign products the Netherlands canning industry endeavors to deliver at the lowest possible price by improving efficiency in factories and at the same time by paying all possible attention to quality.

The quality control on canned fish is based on an order of the Marketing Board for Fishery Products and consists of organoleptical and chemical bacteriological examinations.

The first examination is carried out by the Committee for the Inspection of Canned Fish. This committee consists of a neutral president, two food specialists, a wholesaler, a retailer, two fish-canning manufacturers, and a few civil servants. The committee meets regularly to judge samples drawn from lots by specially appointed inspectors. The samples are tested for numerous qualities as flavor, taste, odor, consistency of sauce, cleanliness, and appearance.

The activity of this committee has led to a considerable improvement in the quality of Netherlands canned fishery products. Also there is a chemical-bacteriological examination to ascertain the keeping qualities and acidity of the canned products. This is carried out in the laboratory of the Governmental Institute for Fisheries Research at Den Helder. Here samples are examined of all lots offered for export. If they do not prove to be satisfactory, the Marketing Board for Fishery Products does not grant an export licence. Needless to say the purpose of these measures is to raise the quality to the highest possible standards.

In this connection it should be reported that in addition to the prizes for the best handling of sea fish and herring on fishing vessels, the Marketing Board for Fishery Products has also offered an annual prize for the best canned product. The winner of the prize is allowed to state this fact on the label of the cans for two years after the date the award was granted. The issue of the prize takes place at the same time as those for the best-handled sea fish and herring.

Norway

"LIGHT RAY FISHING SINKER" INVENTED: A new gear, suitable for many different methods of fish, has been invented in Sigerfjord, Norway, reports the Norwegian Fishing News (Vol. II, No. 2, 1955). It is called "Light Ray Fishing Sinker," and may be used for trolling, trawling, and net fishing. The gear consists of a container constructed by a special yellow-brass alloy able to endure sea water with a very high degree of salinity. The Norwegian Governmental Technological Institute, having tested the quality of the new equipment, declares that the gear withstands a pressure corresponding to a depth of over 8,000 feet.

From four "windows" or "eyes" located in the upper part of the container, electric light rays attract the fish. Most species are shortsighted, and the fish go to the very source of light where they remain floating and watching in the immediate vicinity of the sinker.

The lower part of the container, equipped with hooks, lies in darkness. When the gear is moved upwards, the fish are immediately hooked.

This gear is used for trolling, and is an excellent support for trawling and net fishing for cod and other fish. For trawling, several Light Ray Sinkers are used, placed on a special hoop arranged at the opening of the trawl net. The effect of this arrangement is that the fish gather in front of the trawl opening, and thus the catch is considerably increased. This method has been tried in several places and the results have proved encouraging. For net fishing a similar way of fishing has been achieved, the Light Ray Fishing Sinkers being, however, arranged in a somewhat different manner.

The new gear has been tried in the Pacific, also in the salmon fisheries, and the catches have been promising.

The inventor advises that he will be at the service of fishermen who want to make use of the new gear. The Norwegian Council of Exports is expecting an increasing demand for this new article all over the world. Production has been organized with several suppliers who may now easily produce 10,000 Light Ray Fishing Sinkers every week. Export has taken place to many countries, and the inventor is cooperating with the FAO Fishery Division for the delivery of his gear to underdeveloped countries.

The inventor has also constructed a new type of purse net, which equipment will shortly appear on the market.

Pakistan

MOTHERSHIP FLEET TO FISH FOR SHRIMP IN PAKISTAN WATERS: A freezer-trawler mothership, the Tatsuta Maru of about 550 tons, and two auxiliary otter trawlers of about five tons each, belonging to the Nippon Riza Company arrived at Karachi May 14 to fish for shrimp in waters off the West Coast of Pakistan. For the past 4 or 5 months this fleet has fished in the Persian Gulf west of Pakistan under a contract with the Iranian Government. The fleet comes to Karachi under a contract (valid until September 1955) negotiated by a United States citizen who resides in Karachi.

The agreement which has been approved by the Central Fisheries Department and the Ministries of Agriculture and Industry, stipulates that an officer of the Central Fisheries Department is to accompany the fleet as observer and have access to catch records. Catches are to be landed at Karachi and exported through regular customs channels. Not more than 60 percent of the foreign exchange earnings are to be paid to the Japanese firm for expenses and profit combined.

The Japanese manager stated that only about 8 tons of headless shrimp were frozen during the four months of operations in the Persian Gulf although a substantial number of small shrimp were discarded. The vessel is also said to have about 180 tons of frozen fish aboard. Efforts are being made to dispose of as much fish as possible locally to make room for additional catches.

Freezing on the mothership is done in pans on plate freezers. The five-pound blocks of shrimp are packed in cellophane bags and then in pasteboard cartons. The grading and packing was excellent but some blackening was noted on one sample inspected.

Panama

FISH-MEAL PRODUCTION: A Panamanian shrimp-fishing combine is reported preparing to install a reduction plant to manufacture fish meal and oil by using the finfish caught incidental to shrimp fishing operations.

Another recently-opened fish-meal plant is reported to be having operation difficulties because of handicaps in obtaining supplies of fish.

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Portugal

FISH CANNING TRENDS, 1954: The Portuguese sardine canning industry had an outstanding profitable year in 1954 due largely to the fortunate coincidence of good catches in Portugal and poor catches in the important competing areas of North Africa, reports a May 6 U. S. Embassy dispatch from Lisbon. The chief problems of the Portuguese sardine canning industry are: (1) the uneconomic dispersion of the business among dozens of small canneries; (2) the lack of centralized arrangements for purchasing fresh fish at the lowest possible price; (3) primitive methods of packing and canning, even in the newer plants; and (4) poor merchandising. Efforts are being made to correct the first two of these defects, but the current prosperity has removed some of the sense of urgency.

Conditions are less favorable in the anchovy industry due to a poor catch in 1954. Supplies of fish were so short that some quantities had to be imported to keep the canneries operating. The activity is considerably less important than sardine canning, however, and the slowdown in output has had only minor local impact in a few villages on the southern coast.

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Spain

VIGO FISHERIES TRENDS, APRIL 1955: Fishing: Total catches of fish entered through the port of Vigo, Spain, during April increased substantially in volume over the previous month, and were about 55 percent larger than April 1954, a May 10 U. S. consular dispatch from Vigo points out.

Abundance of "castaneta" (brama-raii), although in smaller quantites than in the previous month, and large catches of jurel or horse mackerel (Tracharus tracharus) permitted the short-range fleet to operate under relatively satisfactory conditions. Both these species are, however, declining in numbers as the season draws to a close and if sardines do not appear soon, this branch of the fishing fleet will face difficult times. The sardine fishing season was to open on May 1 and there were signs that while still scarce, sardines will be more abundant than in previous years since large schools have been seen within a short distance of the littoral.

Fish Canning: Conversations between members of the Union de Fabricantes de Conservas de Galicia (Galician Fish Canners Association) and officials of the syndical organization for the integration of the former into the SINDICATOS have reached a stalemate since neither of the parties, apparently, wishes to agree to the demands of the other.

Fish-canning operations during April improved substantially over the previous month due to the availability of "castaneta," a species of the albacore family which is packed and sold as albacore in the home market and exported to most of the

South American countries. Fish-canning establishments in the Vigo area purchased during April 2.1 million pounds of fish, or about 18.4 percent of the total catch entered through the port. This compares to 86,000 pounds or about 1 percent of the catch in the previous month, and 147,336 kilos, or about 4.5 percent of the catch in April 1954. The industry could have operated at a still higher level in view of the availability of fish, but canners continued to save their small stocks of tinplate in anticipation of the sardine and albacore tuna season.

The canning industry was again facing the problem of shortages of tinplate. Stocks on hand were reported to be sufficient to take care of canning operations for only one month should sardines and albacore tuna become abundant. The industry is pressing the government to hasten the importation of tinplate to be bought under the United States aid program and to authorize importations from France and Germany.

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CANTABRIAN FISHERIES TRENDS, APRIL 1955: Excellent Anchovy Catches Along Cantabrian Coast: After a winter of poor fishing, very good anchovy catches on the Cantabrian coast occurred in March and April. A total of 3.2 million pounds of anchovies were brought into the port of Santoña, Santander, by the local and nearby fishing fleets in the five days of April 11-15. The anchovies had first appeared this season off San Sebastian on March 13. By April 16 the second run of catches had terminated, momentarily at least. The anchovies, all destined for the local canners, sold at prices of from 2.3 pesetas to a high at the end of the week of 2.8 pesetas a kilogram (4.8-5.8 U. S. cents per pound). The fish were said to have been of excellent quality numbering from 14 to 18 fish to the pound. It is estimated that more than 9 million pesetas (US$411,000) worth of fish were sold at the port during the week.

The following week catches began at Castro Urdiales, Santander, and by April 25 anchovies were being brought into ports all along the Santander and Asturias coast, selling at around 2.7 pesetas a kilogram (5.6 U. S. cents per pound). About 2,888,000 pesetas (US$132,000) is the estimated value of the catch brought into Castro Urdiales during April. This exceeds by 0.5-million pesetas (US$23,000) the amount of the catch at this port the previous year.

The effect of these excellent catches on the people of the Cantabrian fishing ports, who have been suffering through a long winter of poor catches, is discussed in the May 1 Alerta, a Santander daily paper. The article discusses the Italian anchovy quota, which has a direct effect on the prices fishermen of this coast receive for their anchovies. It points out that even from a catch as large as the recent one at Santoña the benefit (an average of about 1,500 pesetas or US$68) to each fisherman is not great. Each fisherman must pay his debts of the past winter. The article mentions also the profit in wages which the fishermen's wives receive from the renewed activity of the canneries.

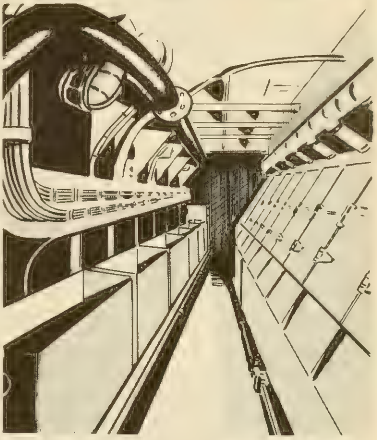
At the end of April press reports indicated that the Madrid Government and banking authorities had agreed upon loans to be made to fishing vessel owners for modernization, a May 27 U. S. Embassy dispatch from Madrid points out. The amount of the financial assistance to be offered was still under discussion.

United Kingdom

FREEZING-FISH-AT-SEA EXPERIMENT ON COMMERCIAL SCALE: Freezing-fish-at-sea experiments on a commercial scale were scheduled to be carried out in the 18-year-old German-built and Grimsby-owned trawler Northern Wave which was to sail from Hull bound for the Icelandic fishing grounds under charter by the British White Fish Authority. The experimental voyages were expected to go on for about a year under the supervision of a staff from the Department of Scientific and Industrial Research and the White Fish Authority. The management of the vessel was being undertaken by its owners on behalf of the charterers, states an April 21 U.S. consular dispatch from Manchester.

The total cost was estimated at about ₤105,000 (US$294,000) which was to be shared between the White Fish Authority, H. M. Government, and the Distant Water Vessel Owners' Development Committee.

Tests have been carried out for some time with North Sea fish by the Torry Research Establishment, Aberdeen, where the special freezing equipment for the Northern Wave was developed, using a small experimental trawler. The purpose of the scheduled test was to try the experiment on a commercial scale on fish caught under severe conditions in the distant-water fishing grounds to ascertain whether these fish retained their sea-fresh quality. For this commercial experiment a commercial freezer prototype was ordered from a Dartford firm who is said to have introduced some refinements into the Torry design.



On the right of the above illustration is a bank of doors enclosing some of the quick-freeze compartments on the Northern Wave. On the left are the freezing cans into which the fish are placed for transfer to the cold-storage room that is separately refrigerated by pipe grids at -20° F.

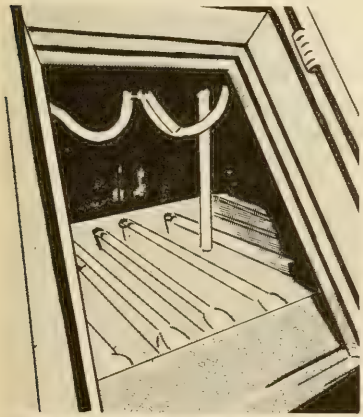


Illustration of one of the 16 compartments in the Northern Wave, measuring 36x18x4$\frac{1}{2}$ inches. Here the fish are quick frozen into 60-pound slabs between vertical metal plates. Each of these units produces 3 slabs at a time. From here they are removed to the cold-storage compartment.

The Northern Wave was said to be the first standard-size distant-water fishing vessel to be equipped for freezing fish at sea. The ship is 188 feet in length, with a hold capacity of about 18,000 cubic feet, thus being similar in size and capacity to the newest British deep-water trawlers.

The catch of each experimental voyage was to be landed at either Hull or Grimsby. The frozen fish was to be sold to coastal merchants and processors under arrangements agreed with the trade associations. Consignments were to be checked down the chain of distribution in order to determine whether the product is satisfactory to fish dealers, fish friers, and the public. Some of the frozen fish, however, was to be held back for long-term storage to assess its quality-keeping potentialities.

While freezing part of a trawler's catch would add to the operating costs which are said to approximate ₤300 (US$840) a day at present, it is reasoned that it would be possible, if it is proved practicable and efficient to install freezing equipment, to keep trawlers on the fishing grounds for a day or two longer each voyage. Thus, it is argued, the time spent fishing would be increased and the storage capacity of the vessels would be better utilized. The quick freezing of the early part of the catch, it is also thought, would bring an improvement in the quality of the fish landed.

However, the Northern Wave, which is said to be the first standard-size distant-water fishing vessel equipped for quick freezing at sea, did not leave, as was expected, on its first trip to Icelandic fishing grounds, according to reports from Hull which indicate the vessel is still occupying a berth there and that it may be several months before the Northern Wave can put to sea. The reason given, as reported by the press, is an unexpected delay in completing the installation of the equipment, a June 15 U. S. consular dispatch from Manchester reports.

The press reports state further that how much the delay will add to the capital cost of £105,000 (US$294,000) for the conversion cannot yet be calculated.

It was explained to press representatives who recently visited the experimental trawler that during the spring and summer months when fishing was at its peak the supplies were often in excess of market requirements, and that at present the surplus was sold to fish-meal plants at prices far below the cost of production. One objective of the experiment was therefore to discover whether it was practicable and economical to hold the unsold surpluses of quick-frozen fish in first-class condition, and so secure a general improvement in quality of fish caught in distant waters. It is expected that Hull, Grimsby, and Fleetwood trawler owners will closely watch the experimental trips in order to decide whether the conversion of their fleets for quick freezing part of their catches is an economic proposition.

Press reports state that part of the Northern Wave's fish hold was converted for the experiment. The size of the freezing plant and cold-storage structure does not reduce the total capacity unnecessarily, and the hold capacity will still permit the vessel to return with a catch bigger than the fleet's average in recent years.

To freeze continuously with its rate of catching would have required, according to reports, an installation over three times the size of that adopted which is a vertical-plate freezer and is based on a plant that has for some time been used for whale meat. The refrigerating machinery consists of two 25-hp. condensing units serving the freezers. These are twin-cylinder machines with a bore of $7\frac{3}{4}$ inches and a stroke of 6 inches running at 475 r.p.m. For fish storage there is a twin-cylinder compressor of 4-inch bore and $3\frac{1}{2}$-inch stroke running at 500 r.p.m. Compressor and pump are driven from an 8 hp. motor. The refrigerating machinery is installed forward of the fish hold in a compartment which was formerly part of the net store. The increased demands for electrical power to drive the freezing installation have made it necessary to install new generators in the vessel's engine-room. Power for the freezers is supplied by a 48-kw. steam generator, and for auxiliaries and cold storage by a $17\frac{1}{2}$-kw. Diesel generator. A 48-kw. Diesel generator acts as standby for both.

The quick-freezing plant can handle 560 pounds of fish an hour, and working at full efficiency it is expected to freeze about 70,000 pounds of fish on each of the experimental voyages. This is reported to represent about 20-25 percent of the trawler's average catch. The rest will be stored in ice in the usual way. The fish will be frozen whole in slabs of about 60 pounds each measuring about 36 by 18 by $4\frac{1}{2}$ inches, which can be preserved for months if stored under proper conditions. Most of the fish caught on Arctic grounds is cod and this is therefore the main species to be frozen.

In this type of freezer, the fish are placed between vertical metal plates, refrigerated at -35° F. and are frozen into slabs about 36 in. by 18 in. by $4\frac{1}{2}$ in. When the fish has reached a temperature below 0° F., which takes between $4\frac{1}{2}$ and 5 hours, the slabs are released by moving the plates apart while simultaneously warming the metal by hot refrigerant gas. The operations of opening and closing the plates and of switching from cold to hot refrigerant are controlled by two levers. The

Northern Wave installation comprises 16 units loaded in rotation, each unit producing 3 slabs at a time. The freezers are installed in the cold storage, but are loaded and operated from fore-and-aft passages communicating with the iced fish hold; the slabs drop into the cold storage and are subsequently stacked there. The cold storage is separately refrigerated by pipe grids at -20° F.

Each freezing cabinet is divided into two sections, each with an independent cooling circuit fitted with a thermostatic expansion valve and with a hand-operated changeover valve so that there can be an immediate switch from freezing to hot-gas defrosting for freezing the blocks of fish from the evaporator plates.

Several problems arose in the design of the installation. In order to prevent drying out of the frozen fish, it is necessary to reduce the heat penetrating into the cold storage to a minimum. This is especially difficult as the space is relatively small, and is at a temperature which is very low for marine practice. Structural members pierce the insulation, and where this occurs the steel has been replaced by reinforced plastic members of lower heat conductivity. To help in handling the doors and hatches to the refrigerated space in a heavy sea, a lightweight construction of glass-fiber reinforced plastics was adopted. Special changeover valves for the refrigerant pipelines, to be used during the release of slabs, were designed and manufactured on a suggestion of the Torry Research Station.

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ELECTRICAL FISHING EXPERIMENTS: A further advance in methods of locating fish shoals is envisaged by experiments carried out in the North Sea by the Scottish Home Department's marine laboratory at Torry in cooperation with the Herring Industry Board, reports the May 27 issue of The Fishing News, a British fishing periodical. The experiments are in the earliest stages, but should they lead to commercial practicability, the harvests from the sea are incalculable.

A long-term view of these experiments pictures a fishing fleet whose personnel will be largely electricians making their catches almost automatically at the throw of a switch.

Research was carried out over the past year by the Herring Industry Board's vessel Silver Scout, and the recent sale of the boat to Ireland has brought its purpose to the limelight. The vessel could be the prototype of the fishing boat of the future.

An official of the Torry Marine Laboratory told the Highland News, a Scottish paper, that the experiments were only temporarily suspended by the sale of the Silver Scout. While advising caution as to the near-future possibilities of electric fishing at sea, he added that "the possibilities seem to be worth exploring."

The latest experiments have been conducted to obtain precise evidence of the reactions of fish to a range of electrical stimuli and to test the efficiency of small-scale electrical fishing gear at sea.

One of the experts concerned said that since before the war considerable success had been obtained in fresh water, but the higher conductivity of sea water presented more engineering problems. He pointed out that there was a limit to the size of generating plant which could be carried by a boat. A generating plant about half the rating of the main engines would seem, he said, to be about the limit at least for the moment.

"If fish cannot be caught in economic quantities with this power then it becomes difficult to see any commercial prospects for marine electrical fishing in the near future," he added, but he suggested that results could be anticipated using electrical fishing apparatus in conjunction with a trawl or other gear.

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ECHO-SOUNDING EXPERIMENTS ON FISH: Fish of different sizes may be identified eventually with one sounding, and it may then be possible to estimate the number of identified fish within one sounding. This is one of the conclusions reached by scientific officers of the British Ministry of Agriculture and Fisheries, in a report on "Echo Sounding Experiments on Fish."

The experiments took place on Lake Windermere at a depth of 35 fathoms to discover new methods of echo-sounder identification used to trace shoals of fish, reports The Fishing News (May 20, 1955), a British fishery periodical.

Fifty dead cod and a half cran of herring were hung in their swimming positions from netting stretched across a frame, which in its turn was suspended beneath an echo sounder. Artificial rubber balloons, which simulated the air bladders of fish (which provide most of the signals showing the whereabouts of large shoals of fish) were hung alongside. Observations were made on different numbers of cod, herring, and air bladders at different depths, and it was found that the duration of the signal increased with increasing numbers of fish.

The scientists were able to reach two conclusions: (1) That it is possible that fish of different sizes may be identified eventually with one sounding; if so, it may be then possible to estimate the number of identified fish within one sounding. (2) That the air bladder taking up 5 percent of the volume of a fish is probably responsible for 40-80 percent of the returned signal.

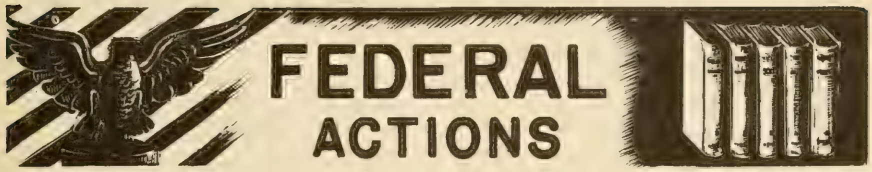
Venezuela

CANNED FISH EXPORT SUBSIDY PROPOSED: The Venezuelan Ministries of Development and Agriculture now have under study a proposal made by the Economic Section of the Foreign Office to grant an export subsidy on canned fish. The Foreign Office points out that a differential exchange rate may not be granted under present agreements with the International Monetary Fund, but it advocates a direct export subsidy or premium on the surplus part of the fish pack that can be sold abroad if the price is satisfactory.

In making this recommendation the Foreign Office calls attention to the fact that other countries have adopted a similar method to move surpluses.

Yugoslavia

CANNED FISH PRODUCTION: Yugoslavia's pack of canned fish has climbed steadily from 1,745 metric tons in 1939, to 1,055 tons in 1946 and 2,764 tons in 1950. In 1951 it dropped back to 1,756 tons, but started climbing again in 1952 to 2,663 tons, and rose still higher in 1953 to 3,173 tons and in 1954 to 3,403 tons. Although fish is canned all year, May through November seem to be the months when the bulk of the pack is produced, according to a Foreign Operations Administration report (April 1955) from Belgrade.



FEDERAL ACTIONS

Department of the Interior

FISH AND WILDLIFE SERVICE

NOTICE OF INTENTION TO ADOPT ADMENDMENTS TO ALASKA COMMERCIAL FISHERIES REGULATIONS:

The Secretary of the Interior gave notice in the Federal Register of July 29 that he intends to adopt amended regulations permitting and governing the time, means, and methods for the taking of commercial fish in waters of Alaska, and related matters.

The regulations are to be effective beginning about February 1, 1956, and to continue in effect thereafter until further notice.

Interested persons are given an opportunity to participate in considering changes in the regulations by submitting their views, data, or arguments in writing to the Director of the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., on or before November 18, 1955, or by presenting their views at a series of open discussions scheduled as follows:

Alaska: Dillingham - July 30
Ketchikan - Sept. 1
Petersburg - Sept. 3
Juneau - Sept. 8
Sitka - Sept. 10
Kodiak - Sept. 13
Anchorage - Sept. 15
Cordova - Sept. 17
Seattle, Wash. - Oct. 19, 20, & 21

International Cooperation Administration (Formerly Foreign Operations Administration)

FORMOSA AUTHORIZED TO BUY DIESEL TRAWLER ENGINES:

Formosa was authorized to procure two units of Diesel trawler propulsion engines, to be financed under Procurement Authorization No. 84-730-00-70-5238 of the International Cooperations Administration (formerly Foreign Operations Administration). The Authorization indicated the United States and Possessions, the European Program Countries, Japan, and Canada as the source areas.

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INDIA AUTHORIZED TO BUY FISHERIES EQUIPMENT:

The Government of India has been authorized ICA financing for equipment for fisheries modernization. ICA Purchase Authority 86-18-005-9-50197 approves procurement of the following equipment by the India Supply Mission: Electrical apparatus $2,000, engines and turbines $7,200, and cold-storage units $18,000.

Department of State

FUNDS FOR INTERNATIONAL FISHERIES COMMISSIONS:

Funds totaling $455,000 for international fisheries commissions were included in the State Department fiscal year 1956 appropriations bill (H. R. 5502), signed by the President July 7.

The funds will be apportioned as follows:

	1955/56	1954/55
Inter-American Tropical Tuna Commission	$197,290	$115,445
Northwest Atlantic Fisheries Commission	3,885	3,885
International Pacific Halibut Commission	94,110	49,750
International Pacific Salmon Fisheries Commission (Sockeye) .	141,295	139,500
International Whaling Commission.	420	420
North Pacific Fisheries Commission	13,000	11,000
Expenses of U. S. Commissioners .	5,000	5,000
Total	$455,000	$325,000

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FISHERY PRODUCTS TARIFF CONCESSIONS GRANTED IN 1955 GENEVA GATT NEGOTIATIONS:

Modification of United States import duties on certain fishery products will result from tariff concessions recently negotiated with Japan and other countries at Geneva, Switzerland. The new rates of duty are scheduled to become effective on September 10, 1955, for concessions initially negotiated with Japan, if by August 11 two-thirds of the Contracting Parties to GATT (General Agreement on Tariffs and Trade) have voted favorably on Japanese accession to the Agreement.

United States concessions initially negotiated with third countries will not be made effective until the third countries give effect to its concessions to Japan, which may be on September 10 or later.

In addition to the regular negotiations, the United States renegotiated a modification in its trade agreement obligations with Canada made necessary by Public Law 689 for fish sticks and other portioned fish which have been breaded, coated with batter, or similarly prepared but not containing added oil. The increased duties provided for by P. L. 689 of 20 percent ad valorem if uncooked and 30 percent if cooked in any degree, are to become effective as soon as practicable. Agreement was reached in a "package" settlement concerning United States renegotiation of fish sticks and Canadian actions to modify upward concessions on certain canned fruits and other products. Canada granted the United States certain other concessions and the United States granted Canada a reduction in the duty on certain pickled and salted herring and a binding of the present duty on fresh or frozen crab meat.

Tariff concessions were of two kinds, reductions in duties and "bindings" against future duty increases.

The principal concessions in import duties granted by the United States affecting fishery products are shown in table 1.

Japan granted concessions to the United States as indicated in table 2.

In granting concessions on import items, United States negotiators operated under statutory safeguards to avoid injury to our industrial mobilization base or to domestic industries producing like or similar products. No concession granted by the United States will bring the duty rate on any item below the "peril point" found for the item under procedures established by law. The United States negotiators also operated under the policy announced by the President in his message of March 30, 1954, to the Congress that tariff reductions would be withheld on products made by workers receiving wages which are substandard in the export country. At the conclusion of the negotiations, the head of the Japanese delegation advised that ". .. it is the foremost concern of the Japanese Government that wage standards and practices be maintained at fair levels in industries, including export industries, of Japan."

The United States delegation at Geneva included four public members who expressed their satisfaction with the conduct of these negotiations and the realistic practical approach of the members of the delegation to the negotiations. They indicated that there could be no doubt that the negotiators were devoted to the basic policy of increasing trade and removing barriers, but that within this framework of national policy the negotiators made every effort to assure full protection of the economic interests of United States agriculture, industry, and labor.

(Tables 1 and 2 on page 63.)

Table 1 - Principal Fishery Items on Which the United States Granted Concessions

Tariff Par.	Stat. Class (1954)	Commodity Description	Rate of Duty		Negotiating Country	Total U. S. Imports for Consumption, 1954
			Jan. 1, 1955	Geneva 1955 Agreement		1,000 Dollars
41	2800.000	Agar agar	25%	15%	Japan	897
717(b)	0060.320	Swordfish, fresh or frozen, filleted, skinned, boned, sliced, or divided into portions	$1\frac{1}{2}$¢ lb.	$1\frac{1}{2}$¢ lb.	Japan	2,875
717(c)	0062.290	Fish, dried and unsalted (except cod, haddock, hake, pollock, and cusk, and except shark fins)	$\frac{5}{8}$¢ lb.	$\frac{5}{16}$¢ lb.	Norway	315
718(a)	0065.300 0065.700	Canned tuna, in oil or in oil and other substances	45%	35%	Japan	408
718(b)	0067.210 0067.250	Canned tuna in brine	$12\frac{1}{2}$%	$12\frac{1}{2}$% 1/	Japan	13,473
719(4)	0070.400	Herring, pickled or salted, in bulk or in containers containing each more than 10 pounds of herring	$\frac{1}{2}$¢ lb.	$\frac{1}{4}$¢ lb.	Canada 2/	2,847
720(a) (2)	0075.100	Herring, whole or beheaded, hard dry-smoked	$\frac{1}{2}$¢ lb.	$\frac{5}{16}$¢ lb.	Norway	51
		Crab meat, crab sauce, and crab paste				
721(a)	0080.100	Fresh or frozen, and prepared or preserved not in air-tight containers	15%	15%	Canada 2/	49
	0080.500	Prepared or preserved in air-tight containers	$22\frac{1}{2}$%	$22\frac{1}{2}$%	Japan	2,916
721(b)	0081.500	Clams (except razor clams) and clams in combinations with other substances (except clam chowder)	35%	20%	Japan	174
721(e)	0081.100	Oysters, oyster juice, or either in combination with other substances, in air-tight containers	8¢ lb. 2/	6¢ lb. 2/	Japan	618
		Fish nets and fish netting:				
923	3230.640	Nets valued 50 cents or more per pound	30%	25%	Japan	260
	3230.640	Other nets and netting	40%	25%	Benelux 2/	219
1006	3390.110 3390.120 3390.130	Gill nettings, nets, webs, and seines, and other nets for fishing, or flax, hemp, or ramie, n.s.p.f.	25%	$22\frac{1}{2}$%	Japan	21
1528	5953.900	Pearls and parts, not set or strong, cultured or cultivated	10%	5%	Japan	4,334
1535	9420.300	Fishing rods, n.s.p.f.	\$4.50 ea.; 15% min.; 55% max	\$2.75 ea.; 15% min.; 35% max.	Japan	156
	9420.500 (part)	Parts of fishing rods, n.s.p.f.	40%	30%	Japan	-
	9420.560	Fishing baskets, or creels	45%	25%	Japan	79
	9420.590	Fishing tackle and parts, n.s.p.f., except fishing lines, nets, and seines	45%	25%	Japan	461
1558	0023.800	Frog legs and whole frogs (dead)	10%	5%	Japan	1,077
1677	0980.180 (part)	Goldfish	Free	Bindfree	Japan	(Est.) 21
1705	2933.000	Kelp	Free	Bindfree	Japan	47
1756	0058.100	Tuna fish, fresh or frozen, whether or not whole: Albacore	Free	Bindfree	Japan	11,161
1761	0087.400	Scallops, except fresh	Free	Bindfree	Japan	737
	0087.600	Oysters, not in air-tight containers (except fresh or frozen other than seed oysters)	Free	Bindfree	Japan	425
	0087.790	Shellfish, n.s.p.f.	Free	Bindfree	Japan	363

1/The $12\frac{1}{2}$ percent rate of duty was bound against increase on an aggregate quantity equal to 20 percent of the United States pack of canned tuna during the immediately preceding calendar year.
2/In compensation for United States action under Public Law 689, 83rd Congress, relating to fish sticks and the other fish products described therein.

Table 2 – Principal Fishery Items on Which Japan Granted Concessions to the United States

Tariff Item No.	Statistical Item No. 1/	Commodity Description	Duty to U. S.		Imports from U. S. in 1953 (\$1,000) 3/
			Before Agreement 2/	Under Agreement	
ex 341-2	ex 055-0220	Tomato paste and puree in airtight containers used for packing fish for export	25%	free	4/ 1,209
ex 695	541-0100	Vitamins and vitamin preparations	20%	15%	1,676
ex 733	533-0360	Pearl essence	15%	10%	208
ex 1405-5	681-0710	Steel plates and sheets, tinned, including secondary tin plate	15%	15%	3,032

1/Statistical item numbers for 1954.
2/The rates listed in this column are the Japanese statutory rates as provided for in Japanese Customs Tariff Law.
3/Import data from the United States (including Alaska, Hawaii, and Puerto Rico) are based on official Japanese statistics converted to dollars.
4/Estimated.

Eighty-Fourth Congress

(First Session)

JULY 1955

Listed below are public bills and resolutions introduced and referred to committees or passed by the Eight-fourth Congress (First Session) and signed by the President that directly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown in this section when introduced and, if passed, when signed by the President; but also shown from month to month are the more pertinent reports, hearings, or chamber actions on some bills.

AMERICAN FISHING FLEET MAINTENANCE UNDER COMPETITIVE CONDITIONS: H. R. 7238 (King of California), introduced June 11. A bill to amend title V of the Merchant Marine Act, 1936, as amended, to promote the maintenance of the American fishing fleet under competitive conditions and in the interest of sustained fish food supplies in case of emergency, and for other purposes; to the Committee on Merchant Marine and Fisheries. Provides for a construction-differential subsidy to aid in the construction of new fishing vessels. Title V of the Merchant Marine Act, 1936, as amended, contains the provisions for subsidies or grants to merchant marine vessels engaged in international trade. If the same principles which presently are applied to merchant marine vessels engaged in international trade, would apply to fishing vessels, subsidies or grants up to 50 percent of the construction costs could be given by the Maritime Administration. According to the bill no subsidy shall be awarded "if the applicant does not show sufficiently that the fish or fishery products he or it is producing or intends to produce suffer from foreign competition and that the subsidy is needed to keep the American fishing fleet in such status of efficiency as is necessary to meet the foreign competition."

FISHING IMPROVEMENTS IN PENSACOLA BAY: H. R. 7683 (Sikes), introduced July 28. A bill to authorize the Army Engineers to study the feasibility of modifying an existing project at Pensacola Harbor, Florida, for the purpose of extending a channel to the fish wharves at the foot of B Street in Pensacola and to make other reasonable improvements at that location for the benefit of the fishing industry; to the Committee on Public Works.

GREAT LAKES FISHERY TECHNOLOGICAL LABORATORY: S. 2707 (Potter), introduced July 30. A bill directing the Secretary of the Interior to establish, under the Fish and Wildlife Service, a technological laboratory to serve the Great Lakes region; to the Committee on Interstate and Foreign Commerce. In addition to other research functions the proposed laboratory would be directed to "conduct a study of the ways of utilizing rough fish found in the Great Lakes for which there is at the present time little or no outlet."

INTERIOR DEPARTMENT SUPPLEMENTAL APPROPRIATIONS: The House on July 14 passed H. R. 7278, a supplementary appropriation bill, which proposed additional appropriations for the Fish and Wildlife Service for fiscal year 1956.

The Senate Committee on Appropriations on July 25 reported H. R. 7278, with amendments (S. Rept. 1094).

Senate on July 26 passed with amendments, H. R. 7278, asked for conference and appointed conferees.

The House on July 27 disagreed to Senate Amendments to H. R. 7278, agreed to a conference requested by Senate, and appointed conferees.

Conferees on July 29 reported on H. R. 7278, making supplemental appropriations for fiscal year 1956 (H. Rept. 1586).

The House and Senate on July 30 adopted conference report on H. R. 7278, making supplemental appropriations for fiscal year 1956, clearing bill for the President. The bill provides additional appropriations for the Fish and Wildlife Service as follows: $750,000 for construction, of which $455,000 shall be available for the construction of fish-cultural facilities below Norfolk Dam, Ark., and $6,000 for an auxiliary spillway on the James River at the Dakota Lake National Wildlife Refuge in North Dakota; the remainder for construction of a headquarters building at Pascagoula, Miss., for exploratory fishing and gear development, and repair of hurricane damages at the Woods Hole Biological Station in Mass.; $730,000 for fisheries research under the International Convention for High Seas Fisheries of the North Pacific Ocean.

THE SUPPLEMENTAL APPROPRIATION BILL, 1956: Senate Report No. 1094 (July 23, 1955, 84th Congress, 1st Session), 69 pp., printed. Reports on the supplemental appropriations for the various government agencies for the fiscal year ending June 30, 1956. Includes recommendation of an additional appropriation to the Fish and Wildlife Service for construction of facilities.

SUPPLEMENTAL APPROPRIATION ACT, 1956: House Report No. 1586 (July 29, 1955, 84th Congress, 1st Session), 16 pp., printed. Reports on the supplemental appropriations for the various government agencies for the fiscal year ending June 30, 1956. Includes recommendation of additional appropriation for construction of facilities of the Fish and Wildlife Service.

MINIMUM WAGE INCREASE: House Committee on Education and Labor on July 7 approved a bill (H. R. 7214) to increase the national minimum wage standard to $1 per hour. The effective date of the increase will be March 1, 1956 (H. Rept. 1095).

The House on July 18 reported H. R. 7214 (H. Rept. 1202).

The House on July 20 passed H. R. 7214. This passage was subsequently vacated and S. 2168, a similar bill, was amended to contain the House-approved text and passed by the House. The House insisted on its amendment and requested a conference with the Senate. Conferees were appointed.

During the consideration of the bill the House rejected amendments designed to--fix the minimum wage at 90 cents an hour effective January 1, 1956; increase the minimum wage to $1.10 an hour effective January 1, 1956; and increase the minimum wage to 90 cents an hour effective January 1, 1956, and to again increase it to $1 an hour effective January 1, 1957.

The Senate on July 21 disagreed to House amendments to S. 2168, agreed to hold conference asked by House, and appointed conferees.

The Conferees, in executive session on July 27, agreed to file a conference report on the differences between the Senate- and House-passed versions of S. 2168. As agreed, the bill would provide:

(1) An increase in the national minimum wage from 75 cents to $1, effective March 1, 1956.

(2) The Secretary of Labor shall make an annual report to the Congress containing an evaluation and appraisal by the Secretary of the prevailing minimum wage, together with his recommendations.

(3) Industry committee procedures are strengthened and accelerated.

(4) That minimum wages in Puerto Rico established by industry committees shall be reviewed by such committees at least once each fiscal year.

The Senate on July 29 adopted conference report on S. 2168.

AMENDING THE FAIR LABOR STANDARDS ACT TO MAKE THE MINIMUM WAGE $1 AN HOUR EFFECTIVE MARCH 1, 1956: H. Rept. No. 1095, (July 11, 1955), 3 pp., printed. Reports on H. R. 7214 which was subsequently vacated and substituted by S. 2168, a similar bill.

NATIONAL FISH WEEK: S. J. Res. 89 (Magnuson). Joint resolution introduced July 11 designating the period from October 3 to 8, inclusive, 1955, as National Fish Week; to the Committee on the Judiciary.

Also H. J. Res. 373, similar to S. J. Res. 89, introduced in House July; referred to Committee on the Judiciary.

WATER POLLUTION CONTROL: The House on July 26 reported S. 890, to extend and strengthen the Water Pollution Control Act (H. Rept. 1446).

EXTENDING AND STRENGTHENING THE WATER POLLUTION CONTROL ACT: H. Rept. No. 1446 (July 26, 1955), 18 pp., printed. Reports on S. 890, a bill to amend the Water Pollution Control Act by replacing it with new provisions designed to extend and strengthen the act. The bill adds three significant improvements to the Act by: (1) intensifying the national research effort in water pollution; (2) providing a broader basis for support to State and interstate pollution-control agencies; and (3) providing a reasonable and equitable mechanism for Federal-State cooperation in resolving serious interstate pollution problems.

◆

NEW COATING FOR FROZEN FOODS

A new coating for frozen food, which has as its base a purified vacuum-dried derivative of irish moss mixed with sorbitol and water, is reported. It can be applied either by dipping or spraying and is stated to set in 30 seconds forming a skin around the product. The coating is transparent and resilient and can be removed by peeling. It is said to remain firm at 115° F. (46° C.) and unaffected by freezing. The coating may be used to protect the food from moisture loss or freezer burn.

--National Provisioner, Sept. 3, 1953.

Editorial Assistant--Ruth V. Keefe Illustrator--Gustaf T. Sundstrom

Compositors--Jean Zalevsky, Alma Greene, and Lola Perkins

* * * * * * *

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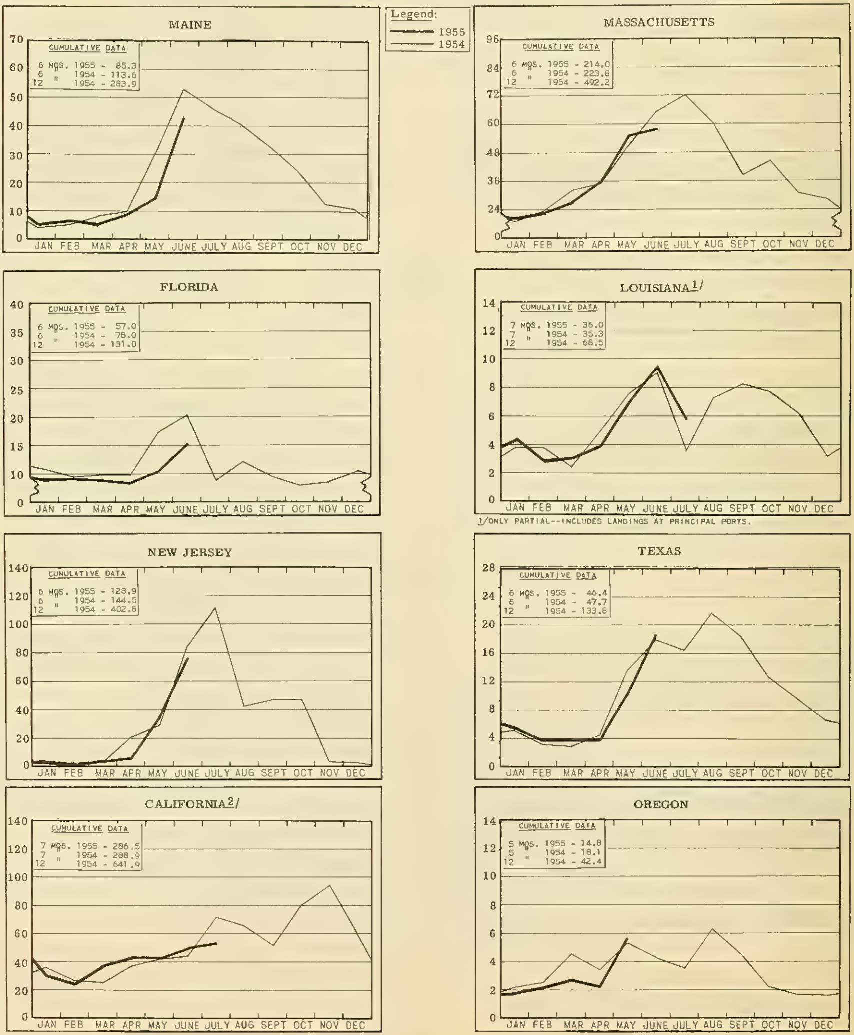
FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

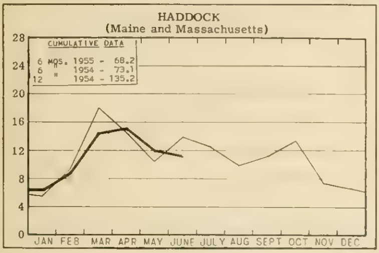


1/ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.

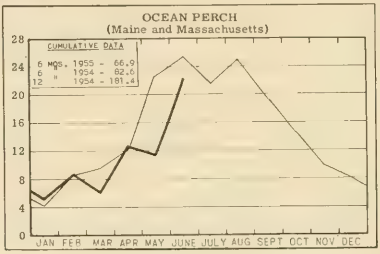
2/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

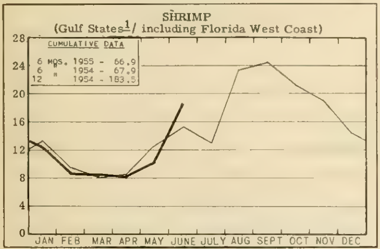
In Millions of Pounds



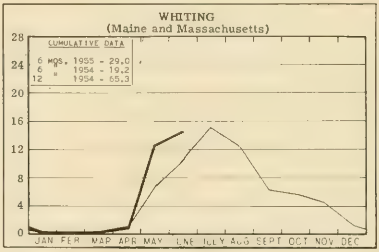
Legend:
—— 1955
—— 1954



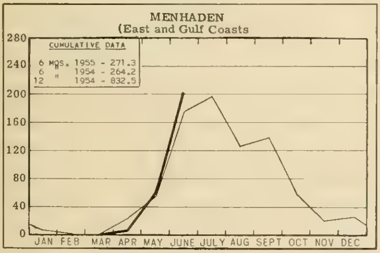
In Millions of Pounds

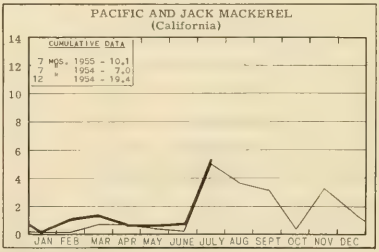


1/ LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

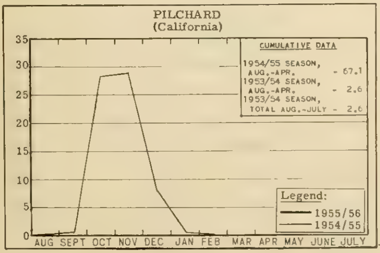


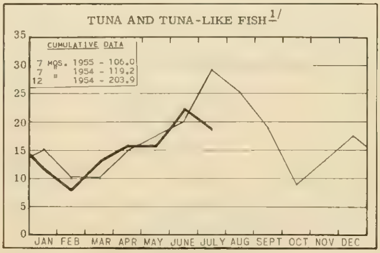
In Thousands of Tons





In Thousands of Tons

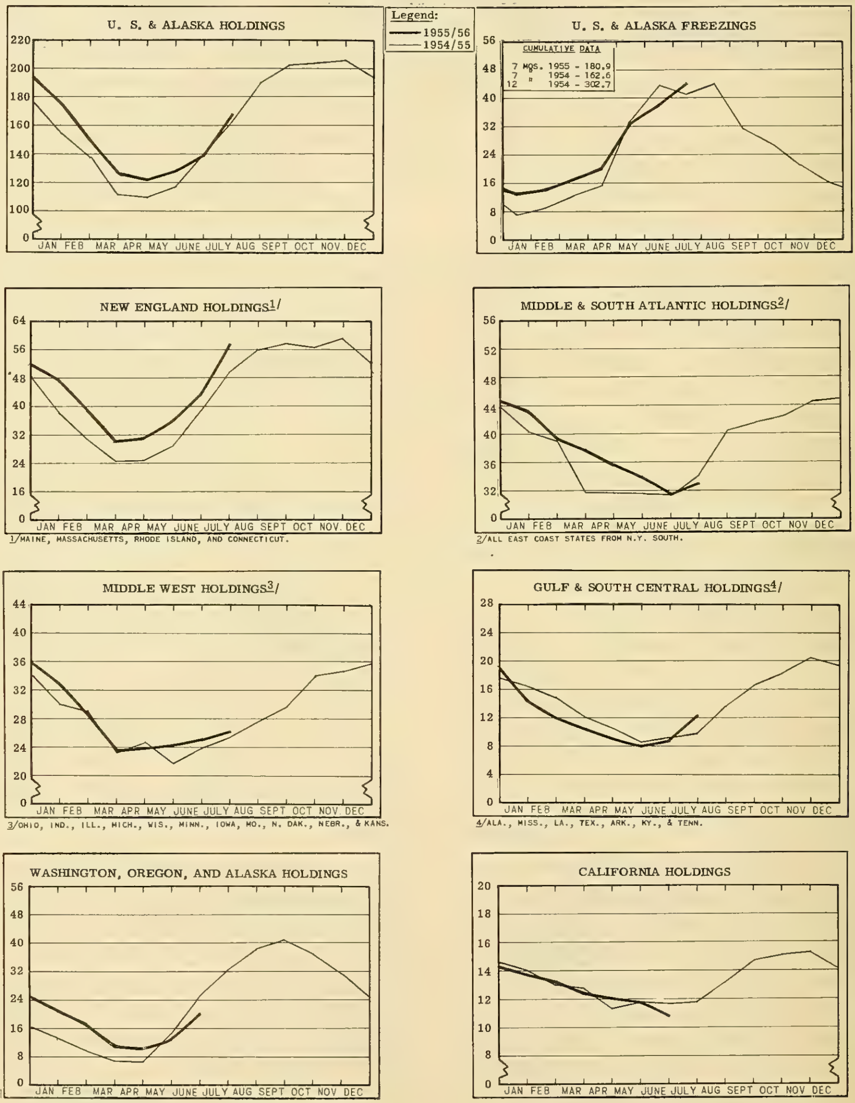




1/ RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds



U. S. & ALASKA HOLDINGS

U. S. & ALASKA FREEZINGS

NEW ENGLAND HOLDINGS1/

1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

MIDDLE & SOUTH ATLANTIC HOLDINGS2/

2/ALL EAST COAST STATES FROM N.Y. SOUTH.

MIDDLE WEST HOLDINGS3/

3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.

GULF & SOUTH CENTRAL HOLDINGS4/

4/ALA., MISS., LA., TEX., ARK., KY., & TENN.

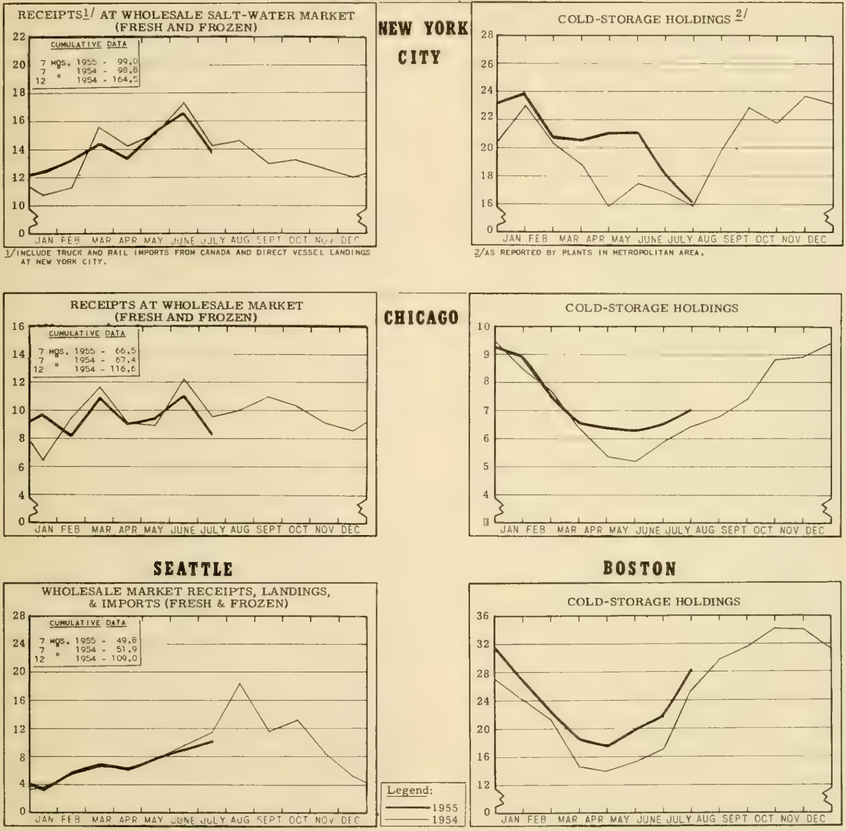
WASHINGTON, OREGON, AND ALASKA HOLDINGS

CALIFORNIA HOLDINGS

*Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pound



1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

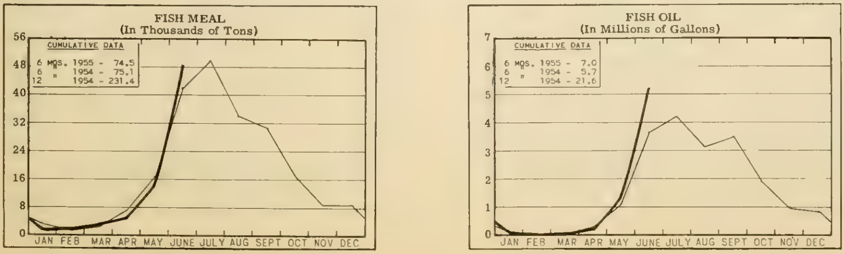
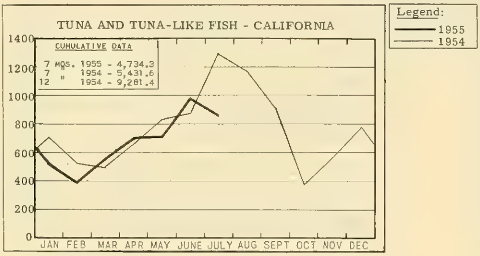
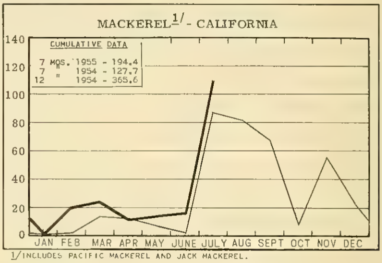


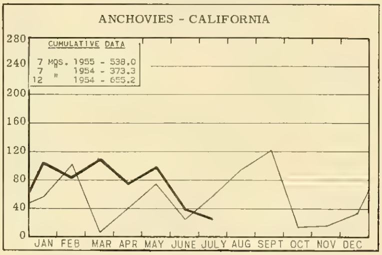
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

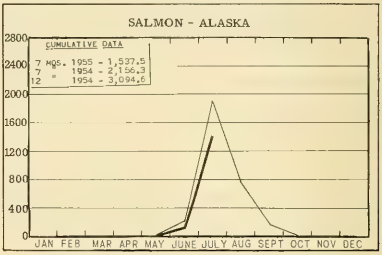
In Thousands of Standard Cases

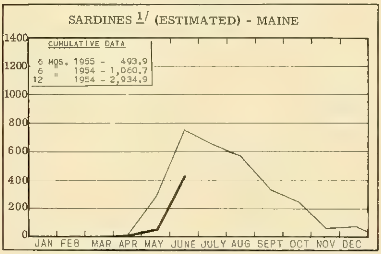

TUNA AND TUNA-LIKE FISH - CALIFORNIA


MACKEREL 1/ - CALIFORNIA

1/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.


ANCHOVIES - CALIFORNIA

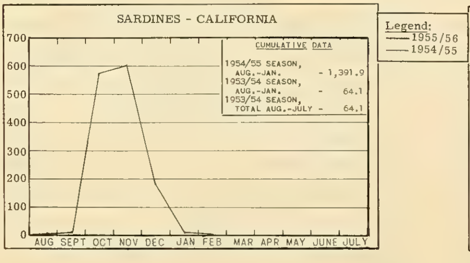

SALMON - ALASKA


SARDINES 1/ (ESTIMATED) - MAINE

1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	¼ drawn	3¼ oz.
SHRIMP..........	48	--	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.


SARDINES - CALIFORNIA

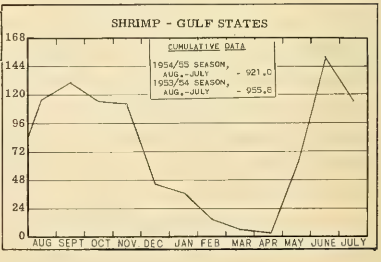
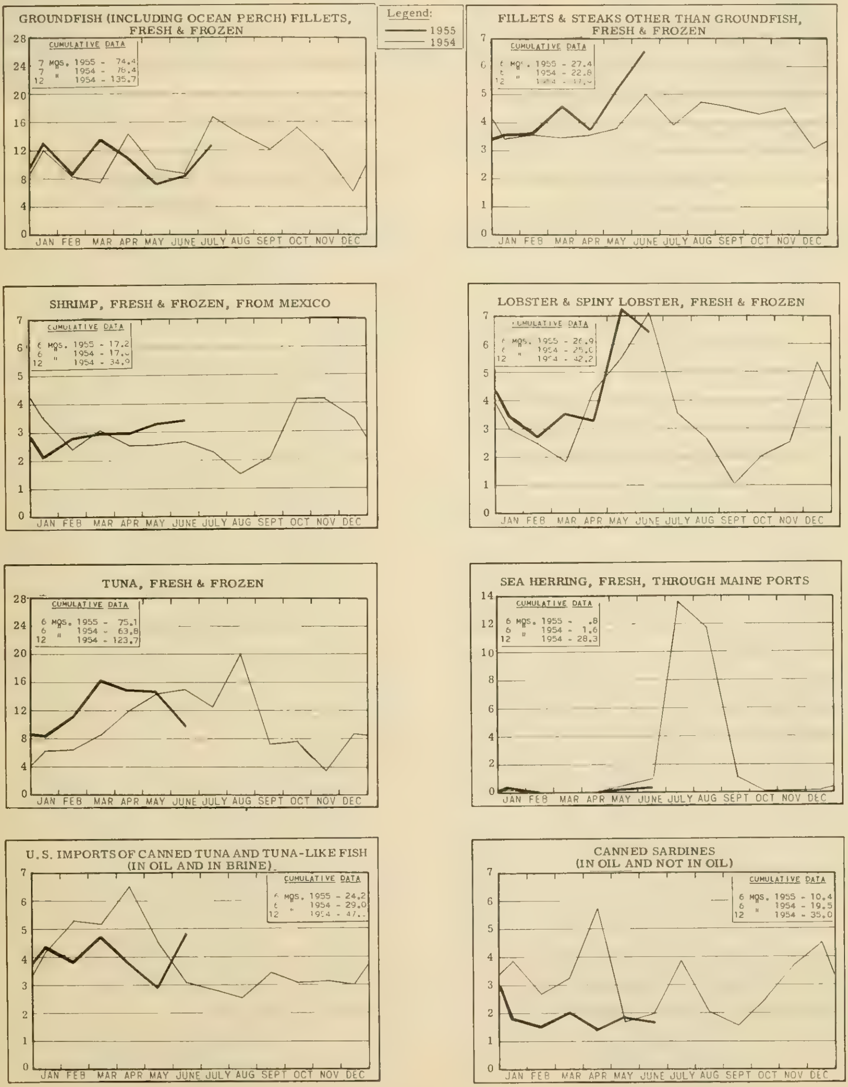
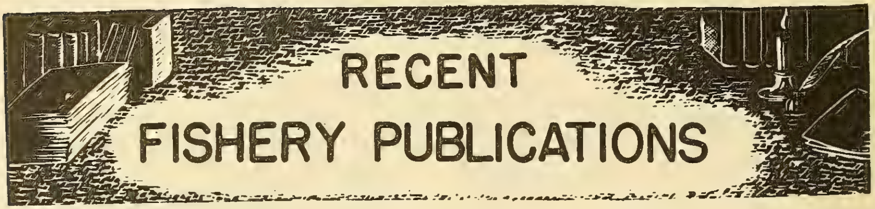

SHRIMP - GULF STATES

CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR.-FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP.- SEPARATES (REPRINTS) FROM *COMMERCIAL FISHERIES REVIEW*.

Number - Title
CFS-1104 - Alabama Landings, Dec. 1954, 2 pp.
CFS-1113 - Rhode Island Landings, 1954, By Gear and Months, 7 pp.
CFS-1150 - Mississippi Landings, March 1955, 2 pp.
CFS-1151 - Mississippi Landings, April 1955, 2 pp.
CFS-1152 - Alabama Landings, March 1955, 2 pp.
CFS-1126 - Mississippi Landings, February 1955, 2 pp.
CFS-1138 - Alabama Landings, January 1955, 2 pp.
CFS-1139 - Alabama Landings, February 1955, 2 pp.
CFS-1140 - New York Landings, March 1955, 4 pp.
CFS-1143 - Frozen Fish Report, April 1955, 8 pp.
CFS-1147 - Rhode Island Landings, March 1955, 3 pp.
CFS-1148 - Massachusetts Landings, February 1955, 5 pp.
CFS-1149 - Meal and Oil, April 1955, 2 pp.
CFS-1153 - Chesapeake Fisheries, 1953 Annual Summary, 6 pp.
CFS-1155 - Frozen Fish Report, May 1955, 8 pp.
CFS-1157 - Maine Landings, April 1955, 4 pp.
FL - 254 - List of Fishery Assns. in the United States, Alaska and Hawaii (Revised May 1955), 12 pp.
FL - 292 - List of Fishery Cooperatives in the United States and Alaska (Revised June 1955), 5 pp.
FL - 422 - Consumer Preferences for Breaded Shrimp and Fish Sticks, 16 pp.
SL - 6 - Wholesale Dealers in Fishery Products, N. Y. Coastal Area (Revised), 11 pp.

FIRMS CANNING (Revised):
SL - 101 - Salmon, 1954, 3 pp.
SL - 102 - Maine Sardines, 1954, 1 p.
SL -102A - California Sardines, 1954, 1 p.
SL - 104 - Mackerel, 1 p.
SL - 108 - Salmon Eggs for Bait, 1954, 1 p.
SL - 110 - Oysters, 1954, 2 pp.
SL - 111 - Clam Products, 2 pp.
SL - 113 - Crab Meat, 1954, 2 pp.

FIRMS CANNING (Revised) (Contd.):
SL - 116 - Food for Animals, from Marine-Animal Products, 1954, 2 pp.
SL - 120 - Anchovies, 1954, 1 p.

FIRMS MANUFACTURING:
SL - 151 - Fish Meal, Scrap, Body & Liver Oils, 1954, 8 pp.
SL - 155 - Marine Pearl Shell Buttons, 1954, 1 p.

SL - 161 - Producers of Packaged Fish, 1954, 6 pp.

SSR-Fish. No. 145 - Contribution to Knowledge of fishes from Bering and Chukchi Seas, by Anatoly P. Andriashev, translated by Lisa Lanz and Norman J. Wilimovsky, 84 pp., illus., processed, May 1955. This is a translation of a paper, first published in a Russian journal in 1937, based on an experimental fisheries survey in Bering and Chukchi Sea waters by the Soviet Government during 1932-33. Since World War II there has been a renewed interest in the resources of Northern regions. Surveys and inventories of our natural resources have been inaugurated under the auspices of several agencies and governmental departments. However, in the case of Alaska, research on the fish fauna by our government has almost all been concerned with commercial fishes as salmon, halibut, and cod. The U. S. Bureau of Fisheries research vessel *Albatross* conducted the last general icthyological survey in the Bering Sea shortly after the turn of the century.

SSR-Fish. No. 146 - Oxygen Requirements of Some Hawaiian Tuna Baitfish, by Austin Pritchard, 34 pp., illus., processed, May 1955.

SSR-Fish. No. 148 - Critical Review of Biology and Control of Oyster Drills *Urosalpinx* and *Eupleura* by Melbourne Romaine Carriker, 156 pp., processed, April 1955.

Freezing Fish at Sea--New England:
Sep. No. 405 - Part 9 - Improvements in the Brine-Freezing mechanism on the Trawler *Delaware*.
Sep. No. 406 - Part 10 - Studies of Miscellaneous Handling Problems.

Sep. No. 407 - Packaging Frozen Fish in Tin Results in Superior Storage Life.

Sep. No. 408 - Technical Note No. 32 - Freezing rates and Energy Requirements for Freezing Packaged Fish Fillets and Fish Sticks in a Multiplate-Compression Freezer.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

Algunos Aspectos de la Dinamica de las Poblaciones y su Importancia para la Administracion de Pesquerias Marinas Comerciales, by Milner B. Schaefer, Bulletin vol. 1, no. 3, pp. 59-88, illus., printed in Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1955. (The English version was published in Bulletin vol. 1, no. 2.)

Australian Journal of Marine and Freshwater Research, vol. 6, no. 1, February 1955, 151 pp., illus., printed, single copy 7s. 6d. (85 U.S. cents). Australian Journal of Marine and Freshwater Research, Commonwealth Scientific and Industrial Research Organization, East Melbourne, C.2, Victoria. Includes, among others, these articles: "Aspects of Reproduction in the Male Humpback Whale, Megaptera nodosa (Bonnaterre)," by R. G. Chittleborough; "Eggs and Larvae of the Sabre-Toothed Oyster Blenny, Dusson steadi (Whitley)," by I. S. R. Munro; "A Revision of the Australian Pearl-Shells, Genus Pinetada (Lamellibranchia)," by J. S. Hynd.

British Columbia Catch Statistics, 1954 (By Area and Type of Gear), 139 pp., illus., processed. Department of Fisheries of Canada, Pacific Area, Vancouver 5, B. C. (Limited distribution.) An annual summary of fish-catch statistics for British Columbia based on Departmental copies of sales slips that are completed by all commercial fish buyers operating within the Province. Statistics are presented by species, months, gear, and area.

(California) Forty-Third Biennial Report of the Department of Fish and Game for the Years 1952-1954, 96 pp., illus., printed. California Department of Fish and Game, Sacramento 14, Calif., Nov. 1954. This report covers the period during which the Department put into effect the decentralized reorganization plan established by the Legislature on June 1, 1951, and the transfer of headquarters from San Francisco to Sacramento, to create a more efficient operating agency. In addition, the report reviews the activities and plans of the Wildlife Conservation Board, the Marine Research Committee, and the various branches of the Department in fostering the conservation and wise uses of California's wildlife resources. A summary of important policy decisions of the Fish and Game Commission and important new legislation affecting fish and game also is included. Among the reports included, that of the Marine Fisheries Branch discusses the commercial fisheries of California--sardine, live-bait, tuna, salmon, jack mackerel, anchovy, Pacific mackerel, clam, abalone, crab, oyster, bottom fish, and shrimp. Also reviewed are the surf-fishing investigations; the work of California's research vessels; fish screen and ladder program; seismic explorations; and the work of the Pacific Marine Fisheries Commission, the statistical unit of the Branch, and the Marine Research Committee. Fisheries statistics are included in an appendix--total production of fishery products; landings (quantity and value) by species; status of the commercial fishing fleet by ports; and number of licensed commercial fishermen.

The Canadian Commercial Fisheries of the Great Lakes, Basebook of Fishery Statistics--No. 2, 220 pp., illus., processed. Department of Fisheries of Canada, Ottawa, May 1955. This is the second of a series of Basebooks presenting statistical information on the Canadian fisheries. The purpose of the series is to make available compilations, analyses, and other information of general use to those interested in the fishing industry, which have not heretofore been conveniently accessible. The publication of this Basebook results from the need for a collection of information in one volume on the commercial fisheries in the Canadian part of the Great Lakes. The Great Lakes fisheries are the subject of an International Convention now under process of ratification by the Governments of Canada and the United States. The Basebook is intended to serve as a reference volume for legislators and as a source of material for administrators, scientists, and the fishing industry generally. The present volume deals with the quantity and value of fish landed on the Canadian side of the Great Lakes, the fishing craft and equipment used, and certain other categories of economic information pertaining to these fisheries. Some geographic information has also been included. The landings series covers the period 1867-1953 and has been broken down by species and by lakes. Charts have been drawn for all but the very minor species and all species have been shown in tabular form wherever possible. Data on such species as muskellunge and black bass, which were taken during the early years, have not been included but the records are available in this office. The landed-value series covers a short period, 1945-53. Records were not available on the same basis, i. e. by species and by lake, prior to this period. This information is presented in tabular form only. The data on fishing craft and equipment used in the fisheries are presented in tabular form for the period 1920-53, by lakes. Other information contained in this volume includes maps and tables dealing with the distribution of fishing enterprises, of fishermen (classified in rather broad income groups), of commercial fishing licenses by type of license and of the fish packing and processing industry with an indication of the extent of its operations. The geographic information includes maps and data on the drainage basins, lake profiles, depth contours, lake levels, surface area, volume, mean outflow, and shoreline length.

Echo Sounding Experiments on Fish, by D. H. Cushing and I. D. Richardson, Fishery Investigations Series II, vol. XVIII, no. 4, 38 pp., illus., printed, 5s. 6d. (80 U. S. cents). Her Majesty's Stationery Office, London, England, 1955. Part I of this report discusses the problem, methods, and treatment of results of echo-sounding experiments on fish conducted by the Ministry of Agriculture and Fisheries. Part II discusses the results of the experiments.

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Fluctuations in Production and Abundance of Commercial Species in the Red Lakes, Minnesota, with Special Reference to Changes in the Walleye Population, by Lloyd L. Smith, Jr. and Laurits W. Krefting, Paper No. 3136 - Scientific Journal Series, 30 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 83, 1953, pp. 131-160.) Minnesota Agricultural Experiment Station, St. Paul 1, Minn.

(FAO) Operations Report, May 27, 1955, FY 1955, Issue No. 3, 101 pp., illus., processed. Statistics and Reports Division, Office of Research, Statistics and Reports, Foreign Operations Administration, Washington 25, D. C. In addition to the usual tables and data, discusses the technical cooperation program.

"The Free Amino Acids of Fish. 1-Methylhistidine and B-Alanine Liberation by Skeletal Muscle Anserinase of Codling (Gadus callarias)," by N. R. Jones, article, The Biochemical Journal, vol. 60, no. 1, May 1955, pp. 81-87, illus., printed, single copy $3.50. Cambridge University Press American Branch, 32 East 57th Street, New York 22, N. Y.

"From Canadian Waters to Foreign Tables," by T. R. Kinsella, article, Foreign Trade, vol. 103, no. 5, March 5, 1955, pp. 12-14, illus., printed, single copy 20 cents. The Queen's Printer, Government Printing Bureau, Ottawa, Canada. A brief review of Canada's fishing industry for 1954, with special reference to fisheries exports and the market outlook. Statistics cover the value of exports by species and by countries for 1950-54.

Georgia Fish Pond Management, 107 pp., illus., printed. State Game and Fish Commission, Atlanta 3, Ga.

A History of Fish and Fishing in the Upper Mississippi River, by Harriet Bell Carlander, 96 pp., illus., printed. A publication sponsored by the Upper Mississippi River Conservation Committee, 1954. A study of the historical background of the upper Mississippi River in relation to fish and fishing, both sport and commercial. For the purpose of this study, the Upper Mississippi River is defined as that part of the river which is between St. Paul, Minnesota, and Caruthersville, Missouri, a distance of 951 miles. For most of the distance it marks the boundary between Minnesota and Wisconsin, Wisconsin and Iowa and Illinois, and Illinois and Missouri. Contains chapters on the early history of the Mississippi River fisheries; changes in the River; fish propagation and rescue work; mussel fishing and the pearl button industry; the Fairport Biological Station; commercial fishing; sport fishing; and legislation and interstate cooperation.

(India) Report on the Activities of the Ministry of Food and Agriculture, during 1954, 68 pp., printed. Ministry of Food and Agriculture, New Delhi, India. A brief review of the activities of the Indian Ministry of Food and Agriculture during 1954, including, among others, sections on fisheries research and development in India.

"The International Law Commission's 1954 Report on the Regime of the Territorial Sea," by Philip C. Jessup, article, American Journal of International Law, vol. 49, no. 2, April 1955, pp. 221-229, printed, single copy $2.50. The American Society of International Law, 1826 Jefferson Place, NW., Washington 6, D. C. Comments on the Report of the International Law Commission on the Regime of the Territorial Sea. The "Provisional Articles" are divided into three chapters: Chapter I, "General;" Chapter II, "Limits of the Territorial Sea;" Chapter III, "Rights of Passage."

Investigation of Sport and Commercial Fishery Activities in Old Tampa Bay North of Gandy Bridge, by James B. Higman and Robert Ellis, Report 55-20, 6 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., April 1955. A report on the results of a survey conducted by the Marine Laboratory of the University of Miami for the Florida State Board of Conservation, dealing with sport and commercial fishery activities in Old Tampa Bay north of Gandy Bridge and the effect of closing Old Tampa Bay to all net fishing except cast netting.

(Japan) Annual Report on Statistics of Marine Fishery Catches and Culture in Shallow Sea, Jan.-Dec. 1953, Agriculture, Forestry and Fishery Statistics Data No. 56, 505 pp., illus., printed in Japanese and English. Statistics and Survey Division, Ministry of Agriculture and Forestry, Tokyo, Japan, November 1954. This report contains catch statistics of the marine fisheries of Japan and culture in the shallow sea for 1953. A general description of the survey methods and explanation of each statistical table are presented. Statistics are given by fish species and prefecture; type of fishery and prefecture; type of fishery and fish species; type of fishery, stratum, and prefecture; number of boats operated in fishing, number of trips, and catch by stratum and prefecture; and culture in shallow sea by prefecture. Appendices cover a summary of catches by fisheries and aquiculture; whaling; North Pacific Ocean fishing; tuna fishing in the South Pacific Ocean; pearling in Arafura Sea; and South China Sea fishing. Illustrations of the principal species of fish in Japan with English and scientific names are also included.

(Maine) 18th Biennial Report, Department of Sea and Shore Fisheries (For Period July 1, 1952 to June 30, 1954), 43 pp., illus., printed. Department of Sea and Shore Fisheries, Augusta, Maine. This report covers the organization and major duties and functions of the Department for the two years ending June 30, 1954. A review of some of the highlights of this period and reports from the following departmental divisions are presented: Law Enforcement; Statistics; Boothbay Harbor Station; and Research. Also presented are progress reports on the soft-shell clam and quahog management investigations; the anadromous fishery program; lobster studies; and oil-pollution studies.

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Morphometric Comparison of Yellowfin Tuna From Southeast Polynesia, Central America, and Hawaii, by Milner B. Schaefer, Bulletin vol. 1, no. 4, pp. 91-136, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1955.

Natural History of the American Shad in Maryland Waters, Supplement no. 4, 2 pp., illus., printed. (Extract from Maryland Tidewater News, vol. 11, no. 11, April 1955.) Chesapeake Biological Laboratory, Maryland Department of Research and Education, Solomons, Md.

Observations on the Live Bait Shrimp Industry of Pasco and Pinellas Counties, Florida, by James B. Higman, Report 55-16, 5 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., April 1955. A report to the Florida State Board of Conservation covering an investigation of reported damage to trout grounds near New Port Richey, allegedly caused by bait-shrimp trawling.

The Osteology and Phylogenetic Relationships of the Blackfin Tuna, THUNNUS ATLANTICUS (Lesson), by Donald P. DeSylva, Contribution No. 140, 41 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 5, no. 1, March 1955, pp. 1-41.) Marine Laboratory, University of Miami, Coral Gables, Fla.

"The Oyster's Messmate," by Romeo Mansueti, article, Nature Magazine, vol. 48, no. 3, March 1955, pp. 125-127, 162, illus., printed, single copy 50 cents. American Nature Association, 1214 16 St. NW., Washington, D. C. A description of the oyster crab, Pinnotheres ostreum, a small crustacean that lives inside the shell of some live oysters. For many years the oyster crab was regarded as a "commensal," that is, a messmate or partner, one that does not harm or was not harmed. Recent investigations have shown that, when numerous, the crabs can cause serious damage to oysters. Oysters rarely contain more than one adult crab, the size of a lima bean, but as many as 200 or more of the tiny, ticklike, early-stage oyster crabs can be found in heavily infested individual oysters.

A Partial Bibliography of Fish Eggs, Larvae and Juveniles, with Particular Reference to Migratory and Estuarine Species of the Atlantic Coast and Supplemented by a Check List and References to the Early Development of the Fishes and Fish-Like Chordates of Maryland Waters, by Romeo Mansueti, 58 pp., processed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., August 1954.

A Plan For Indian Fishing Industry, by U. Shanker Rao, Indian Nautical Literature (Fishery Series), 7 pp., illus., printed. (Reprinted from Indian Finance.) U. Shanker Rao, 25A, Palit Street, Ballygunge, Calcutta-19, India.

Proceedings Symposium on Cured and Frozen Fish Technology, SIK-Publication no. 100, November 1953, 196 pp., illus., processed. Swedish Institute for Food Preservation Research, Goteborg, Sweden, 1954. A collection of papers on cured and frozen fish technology: "Recent Investigations on Protein Breakdown," by A. Tiselius; "A Review of the Microbiology of Frozen and Cured Fishery Products," by J. M. Shewan; "Norwegian Studies on the Bacteriology of Semi-preserved Herrings," by Sverre Hjorth-Hansen; "Changes in Dutch Salted Matjesherring During Storage and Spoilage," by A. F. M. G. Luijpen; "The Bacterial Flora of Fresh Fish and Its Technological Implications," by H. L. A. Tarr; "Quelques Problemes D'Ordre Microbiologique Dans Les Semi-Conserves de Viande," by R. Buttiaux; "Main Problems of Fish Protein Denaturation," by W. J. Dyer; "The Characteristics of Fish Muscle Proteins," by G. Hamoir; "Vorschlag zur Einfuhrung eines neuen Stickstoff-Faktors zur Berechnung des Proteingehalts vom essbaren Anteil des Herings," by Dr.-Ing. Rudolf Dietrich; "Investigations on the Unsaturated Acids of Fish Fat," by Olav Notevarp, Arnvid Roald, Per Sletnes and Sigvard Nordli; "Experiments on Fat Stabilization by Ascorbic Acid with Two Herring Biotypes (Fladen and Iceland)," by Reinhard Marcuse; "Uber den Fett- und Wassergehalt im Herring," by Dr. C. -H. Brandes; "Experimental View-points on Ropiness of Fish Brine," by Gosta Lindeberg; "Freezing Fish at Sea," by Harris W. Magnusson; "Recent Development in Fish-Freezing Techique and Pending Scientific Problems," by Eirik Heen; "The Scientific Foundation of Sanitary Control of Frozen and Cured Fish Products," by Hans Riemann; "To What Extent Does Fish Flesh Break Down Through Autolysis?," by W. Partmann; "Present Status of Fish Processing by Electronic Irradiation at the Massachusetts Institute of Technology," by John T. R. Nickerson and Bernard E. Proctor.

Produccion y Fluctuacion de las Pesquerias (Fisheries Production and Fluctuation), by Valentin Paz-Andrade, 156 pp., illus., processed, in Spanish. Union Espanola de Armadores Pesqueros, S. A., Madrid, Spain, 1954. This booklet contains a detailed study of the Spanish fisheries. It discusses the economic and technical problems affecting the evolution and development of the Spanish fisheries and allied industries. It is divided into twelve chapters and one statistical appendix, each of the chapters illustrated with statistical data and maps.

Recent Biological Studies on TEREDO--A Marine Wood-boring Mollusc, by Charles E. Lane, 7 pp., illus., printed. (Reprinted from The Scientific Monthly, vol. 80, no. 5, May 1955, pp. 286-292.) American Association for the Advancement of Science, 1025 Connecticut Ave. NW., Washington, D. C.

Report of the Fisheries Research Committee, 74 pp., printed. Government of India, Ministry of Food

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and Agriculture, August 1954. A report of the Fisheries Research Committee, appointed by the Ministry of Food and Agriculture for reviewing and assessing the research work of the Central Marine and Inland Fisheries Research Stations. The report discusses the Committee's plan of work; the aims of fisheries research in its bearing on problems of fisheries development, conservation, and management; and fisheries research in the States of India, Universities, and Central Station. Conclusions and recommendations are also presented.

Sanitary Aspects of the Shellfish Industry of Japan, by L. R. Shelton, Jr. and Richard S. Green, 56 pp., illus., processed. U. S. Department of Health, Education, and Welfare, Washington 25, D. C., December 1954. A report of a survey conducted in Japan during the period from January 5 to March 3, 1954 on the sanitary aspects of its shellfish industry. Shipments of frozen clams from Japan have been offered for entry into the United States since 1948. With increasing volume of shipments, the Food and Drug Administration, U. S. Department of Health, Education and Welfare, has found it necessary to deny entry to approximately one-third of the shipments because bacteriological examination indicated that they were not of satisfactory sanitary quality. In view of the bacteriological quality of some of the shipments offered for entry, the Food and Drug Administration was concerned about the lack of first-hand information on sanitary conditions surrounding the growth, processing, and packing of clams in Japan. This lack of information, coupled with the unknown effect of freezing upon bacteria in clams, made difficult the proper discharge of the Administration's obligations to the American public. The Government of Japan, desiring that its industry prepare an acceptable product, requested the assignment of a survey team from the United States to advise and consult with public-health and other government authorities in Japan on the sanitary conditions desirable for the growth, collection, storage, processing, and packing of bivalve mollusks. The U. S. Department of State, after consultation with the Department of Health, Education, and Welfare, accepted the invitation and arranged for the assignment of a bacteriologist and a sanitary engineer to make up the survey team. The findings and recommendations of the survey team are covered in this report.

Sea Fisheries Research Notes, 1954, Fisheries Notice No. 34, 9 pp., printed. Fisheries Laboratory, Lowestoft, England, February 1955. Brief news items on fishery research conducted during 1954 by the British Ministry of Agriculture and Fisheries. A list of scientific and other papers issued by the Ministry is included.

"Sedentary Fisheries and the Australian Continental Shelf," by D. P. O'Connell, article, American Journal of International Law, vol. 49, no. 2, April 1955, pp. 185-209, printed, single copy $2.50. The American Society of International Law, 1826 Jefferson Place, NW., Washington 6, D. C. The author discusses in detail the background, basis, and nature of Australia's claim to the continental shelf adjacent to the coasts of the commonwealth and its territories, with special reference to the sedentary fisheries. The Australian proclamations of September 10, 1953, claiming the continental shelf adjacent to the coasts of the Commonwealth and its territories are interesting in several respects. According to the author, "They depart as to form from the British practice, and so suggest that the United Kingdom drafts have been found by the advisers to the Australian Government to be inadequate; they attempt for the first time to establish a specific relationship between the shelf and sedentary fisheries; and they raise the novel and yet important question of the competence of an Administering Power to extend the boundaries of a Trust Territory. The proclamations were issued only after careful consideration of previous claims and the academic controversies they have generated, and one may conclude from the text that, since the International Law Commission reported on the subject, the concept of the continental shelf and the character of the rights asserted in respect of it have crystallized, and that a definite pattern has now been set for future development of the law."

"The Skeena River Salmon Fishery, with Special Reference to Sockeye Salmon," by D. J. Milne, article, Journal of the Fisheries Research Board of Canada, vol. 12, no. 3, May 1955, pp. 451-485, illus., printed. Fisheries Research Board of Canada, Ottawa, Canada. The general history of the Skeena River commercial salmon fishery is presented from 1877 to 1948. The changes in fishing areas, seasons, and fishing methods are described, together with the trends in the catches obtained. The most accurate data pertain to the important sockeye salmon gill-net fishery. The sockeye catch attained a maximum of 187,000 cases in 1910 and since then has declined to a minimum of 28,000 cases in 1933 and 1943. In recent years the catches have tended to level off. The pink salmon catches declined markedly after 1930. The chum catches also appear to have declined in recent years. Whether or not the spring and coho salmon catches have declined is not known. The size of the sockeye catch appears to be the best available measure of the relative size of the population. An analysis of the age cycles in the catch of sockeye and pink salmon did not reveal a practical basis for prediction. Some possible changes in the fishing regulations are discussed and the need for more data on the fluctuations in the size of the stocks during the fresh-water phase is stressed.

The Smallmouth Bass Fishery of South Bay, Lake Huron, by J. M. Fraser, 30 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 12, no. 1, 1955, pp. 147-177.) Department of Lands and Forests, Southeastern Research Station, Maple, Ontario, Canada.

"Spoilage of Haddock in the Trawlers at Sea: The Measurement of Spoilage and Standards of Quality," by C. H. Castell and Rosalie E. Triggs, article, Journal of the Fisheries Research

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Board of Canada, vol. 12, no. 3, May 1955, pp. 329-341, illus., printed. Fisheries Research Board of Canada, Ottawa, Canada. This paper is the first in a series of studies dealing with spoilage of haddock in trawlers at sea. During a period of eight months, 850 haddock were taken from a trawler from the Nova Scotian and Grand Banks. Immediately after landing, the fish were filleted and the fillets were examined organoleptically and tested for pH and trimethylamine. It was found that trimethylamine was a more sensitive measure of early spoilage in fish muscle than either organoleptic examination or pH. At least one type of spoilage was encountered that was not accompanied by an increase in either trimethylamine or pH. Normally there is a close correlation between the development of most early spoilage odors and an increase in trimethylamine. For these haddock a trimethylamine value of 1-5 mg. per 100 g. indicated that the fish were already producing off-odors or would do so shortly. Trimethylamine is a useful measure of the initial spoilage changes in the fish muscle even though the trimethylamine itself may not contribute to the odors present.

A Survey of the Red Snapper Fishery of the Gulf of Mexico, with Special Reference to the Campeche Banks, by C. Isaac Camber, Technical Series No. 12, 64 pp., illus., printed. Marine Laboratory, University of Miami, Coral Gables, Fla., 1955. Describes a study undertaken by the Marine Laboratory of the University of Miami for the Florida State Board of Conservation, of the Gulf of Mexico red-snapper fishery. This report includes an account of the history of this pioneer Florida fishery, which started about 20 years before the Civil War. It got its start near Pensacola when New England sailors caught snapper while anchored in Pensacola Bay. The industry as a commercial venture began in 1872 and expanded to offshore banks, the most important of which are the Campeche Banks off Mexico. Today the red snapper is one of Florida's most prized food fishes and, according to the author, between 5 and 6 million pounds are landed in Florida annually. It is also a favorite game fish, particularly around the Pensacola area. The object of this study was to obtain basic information on the catch, taxonomy, biology, and ecology of the main species in the red-snapper catch, Lutjanus aya. Due to their importance to commercial fishing, special emphasis has been laid on the red-snapper population on Campeche Banks.

Tide Tables: West Coast North and South America (Including the Hawaiian Islands), for the Year 1956, Serial No. 781, 225 pp., printed, 50 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington 25, D. C.

United States Exports of Domestic and Foreign Merchandise (Commodity by Country of Destination), Calendar Year 1954, Report No. FT 410, processed, Part I, 216 pp., $1; Part II, 366 pp., $1.50. Bureau of the Census, U.S. Department of Commerce, Washington, D.C., May 1955. (For sale by the Superintendent of Documents, Washington 25, D. C.) The statistics in Part I covers exports of domestic and foreign merchandise (including fishery products and byproducts) under groups 00 to group 5 from the United States to foreign countries. Part II covers merchandise under group 6 to 9 (some items of interest to the fishery and allied industries are included).

"The 'Volatile Reducing Substances' Test for Fish Freshness," by P. J. Schmidt and H. M. Mayoh, article, Progress Reports of the Pacific Coast Stations, no. 102, March 1955, pp. 22-23, printed. Fisheries Research Board of Canada, Ottawa, Canada. Brief summary of the results of experiments made with fresh sockeye, coho, and chum salmon to determine how closely the "volatile reducing substances" (VRS) values correlate with organoleptic ratings. The VRS test is based on the theory that volatile odoriferous compounds are produced during deterioration of the fish and that most of these are reducing substances. These reducing compounds are quantitatively estimated by passing air first through a sample of liquid pressed from the fish and then through an alkaline permanganate solution which absorbs the reducing substances from it.

FOOD AND AGRICULTURE ORGANIZATION

The Food and Agriculture Organization has published reports describing that Agency's activities under the Expanded Technical Assistance Program for developing the fisheries of many countries. These reports have not been published on a sales basis, but have been processed only for limited distribution to governments, libraries, and universities. Food and Agriculture Organization, Viale delle Terme di Caracalla, Rome, Italy.

Report to the Government of Israel on Inland Fisheries, FAO Report No. 327, 56 pp., processed, January 1955. Presents the fishing industry as a source of animal protein for human consumption; the Government's responsibilities; the history of fish culture and special problems; the characteristics and commercial fisheries of Lake Tiberias; the work accomplished during the assignment; and recommendations.

Report to the Government of Saudi Arabia on Possibilities for Development of Marine Fisheries, FAO Report No. 330, 15 pp., and maps, charts, and 2 plates of photographs, processed, December 1954. Discusses an exploratory survey by the chartered vessel Peppino of the fishing resources in waters off the Red Sea coast of Saudi Arabia to prove the existence of fishery resources on a commercial basis, and to advise and assist the Government in developing these resources. Includes general observations on the fisheries of Saudi Arabia.

Report to the Government of Jamaica on Inland Fisheries, FAO Report No. 339, 10 pp., processed, November 1954. Discusses the problem of the inland fisheries; the present situation in fish culture; fresh waters as a source of fish food; the species of fish used; and presents a summary of recommendations.

Report to the Government of Burma on Inland Fisheries Development, FAO Report No. 361, 9 pp., processed, March 1955. A report on a brief reconnaissance survey of the inland fisheries to determine the possibilities of development to formulate a program to effect this development, and to indicate the FAO assistance which might be provided.

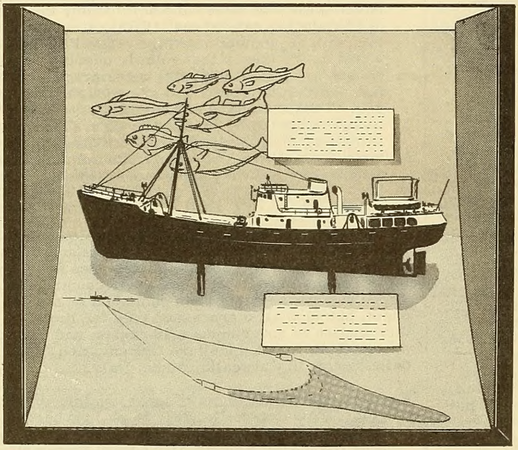
CANADIAN MUSEUM OF FISHERIES

The culmination of five years of joint effort by the Department of Fisheries of Canada and the Royal Ontario Museum of Zoology and Palaeontology in Toronto, a Gallery of Canadian fishes (acclaimed as the finest of its kind to be found anywhere) was opened to the public in the Museum on March 28, 1955.

The completion of the gallery, unique in Canada, was a singular example of cooperation between government, university, and museum. The cost of the display was shared by the Federal government and the University of Toronto, and the work of preparing the exhibits was a joint enterprise of the Department of Fisheries Information and Educational Service and the staff of the Royal Ontario Museum.

Occupying 2,000 square feet of floor space in the Museum, the gallery contains nearly 200 lifelike fish casts, each accompanied by a concise account of the fish's range, habits, and relation to man. Ten cases contain models of Canadian commercial fishing craft, built to scale, one-quarter inch to the foot, so that they are actually facsimiles of the vessels in use. The models are ingeniously mounted on curved backgrounds which illustrate the gear used by each vessel.

The completeness of the exhibit immediately brings to the viewer a realization of the magnitude of Canadian fisheries resources. The exactitude of the replicas shows the result of years of painstaking work. The artists and scientists who made the fish casts first went to both coasts and to inland waters to obtain color notes, sketches, and other data of live fishes. They made plaster moulds in the field of specimens freshly caught and, at the Museum, made the final casts of plaster, celluloid, or liquid rubber. Pearl-essence lacquer made from fish scales was used to coat the models and enhance their lifelike appearance, and oil paints were used to give them a natural coloring. The fins were made of a rubber compound or, in the case of certain species which have clear or translucent fins, of plastics such as cellulose acetate.


Model of a Pacific purse seiner.

Of the 30 individual displays which make up the exhibit, the outstanding ones are contained in four large diorama or habitat cases, which show groups of fishes in their natural environment. They are three-dimensional, and cold cathode light tubes, colored filters, and painted highlights and shadows provide a cool, "underwater" effect, presenting the fish as they would appear to a man in a diving suit. Each of these four cases is eight feet wide, five deep, and 11 feet high. The fish models are held by cleverly hidden or camouflaged supports so that they appear to be swimming. In one instance a section of a gill net shows how the fish are ensnared. Backgrounds are painted to represent underwater landscapes, and the foregrounds, representing the lake or ocean floor, are built up of wire screening and papier mache, modeled and colored to represent mud or rock bottom, either clear or rife with vegetation. An illusion of distance is provided by an exaggerated perspective.

Two decorative murals, treated in simple outline of old gold on a dark red background, are mounted on the wall above the cases which hold the model fishing craft. One of these illustrates the fishing methods used by Canadian aborigines--the Indians of the Atlantic coast with spears, weirs, and smoking methods; the Eskimos using hook and line to fish through the ice, or corralling and spearing fish in open water. The second mural depicts the growth and development of the Canadian fishing industry from its earliest days, when Europeans visited the Grand Banks before Canada was settled, to the present time when technical devices such as echo sounders, radar, and ship-to-shore phones aid the fishermen and modern plants ashore process their catch.

An automatic slide projector, which is used to augment the exhibit, features various phases of the fishing industry, such as the Newfoundland cod fishery, the gill-net and trap-net fisheries of the Great Lakes, the Pacific salmon fishery, and the herring fisheries. Other subjects, like the infamous sea lamprey which has caused havoc in the fisheries of the Upper Great Lakes, are also shown from time to time by the projector.

Another changing exhibit is a "temporary" case which houses different fish from time to time--trout in the spring, muskellunge in the summer; whenever a species is in season or otherwise newsworthy, it can be featured in this display.

CONTENTS, CONTINUED

Page

- FOREIGN: ... 37
  - International:
    - Northwest Atlantic Fisheries Commission:
      - Regulation of Net-Mesh Size in Subareas 3 and 4 Agreed upon at Ottawa Meeting ... 37
    - Territorial Waters:
      - Chile, Peru, and Ecuador Reaffirm Principles of 200-Mile Territorial Waters Zone ... 38
      - 200-Mile Territorial Waters Zone Ratified . 38
  - Australia:
    - Japanese Canned Tuna Offered in Australia Cheaper Than Australian Product ... 38
    - Spiny Lobster Industry, 1953/54 ... 39
    - Western Australian Spiny Lobster Catch at Record High ... 40
  - Canada:
    - Labeling Requirements for Imported Fishery Products ... 41
    - British Columbia Midwater Herring Trawl Tests Successful ... 41
    - Quebec Raises Minimum Size of Lobsters for Canning ... 41
    - Commercial Atlantic Salmon Season in Newfoundland ... 42
  - Denmark:
    - Sand Launce Used for Fish Meal ... 42
  - Dominican Republic:
    - Commercial Fishing Industry Started ... 43
  - Ecuador:
    - Foreign Vessels Require License to Fish within 200-Mile Zone ... 43
  - German Federal Republic:
    - Marine-Oil Industry, 1954 ... 44
  - Greece:
    - Frozen Fish Consumption Increasing ... 45
  - Iceland:
    - New Fish-Processing Plants ... 45
  - India:
    - Status of the Fisheries ... 45
    - Indo-American Fisheries Program ... 46
  - Japan:
    - Canned Tuna Movement to United States ... 48
    - Cooperative Sales Assocation to Allocate Frozen Tuna Exports ... 48
    - Export Policies Revised ... 49
    - Fisheries Training Vessel to Sail for North Pacific ... 49
    - "Fish Shelters" to Improve Inland Sea Fishing 49
    - Experiments with Fresh-Water Pearl Oysters. 50

Page

- FOREIGN (Contd.):
  - Netherlands:
    - Fisheries Catch, 1954 ... 50
    - Fish-Canning Industry Developing Fast ... 52
  - Norway:
    - "Light Ray Fishing Sinker" Invented ... 53
  - Pakistan:
    - Mothership Fleet to Fish for Shrimp in Pakistan Waters ... 54
  - Panama:
    - Fish-Meal Production ... 55
  - Portugal:
    - Fish Canning Trends, 1954 ... 55
  - Spain:
    - Vigo Fisheries Trends, April 1955 ... 55
    - Cantabrian Fisheries Trends, April 1955 ... 56
  - United Kingdom:
    - Freezing-Fish-At-Sea on Commercial Scale . 57
    - Electrical Fishing Experiments ... 59
    - Echo-Sounding Experiments on Fish ... 60
  - Venezuela:
    - Canned Fish Export Subsidy Proposed ... 60
  - Yugoslavia:
    - Canned Fish Production ... 60
- FEDERAL ACTIONS: ... 61
  - Department of Interior:
    - Fish and Wildlife Service:
      - Notice of Intention to Adopt Amendments to Alaska Commercial Fisheries Regulations 61
  - International Cooperation Administration:
    - Formosa Authorized to Buy Diesel Trawler Engines 61
    - India Authorized to Buy Fisheries Equipment . . 61
  - State Department:
    - Funds for International Fisheries Commissions 61
    - Fishery Products Tariff Concessions Granted in 1955 Geneva GATT Negotiations ... 62
  - Eighty-Fourth Congress (First Session), July 1955 64
- FISHERY INDICATORS: ... 66
  - Chart 1 - Fishery Landings for Selected States . 66
  - Chart 2 - Landings for Selected Fisheries ... 67
  - Chart 3 - Cold-Storage Holdings and Freezings of Fishery Products ... 68
  - Chart 4 - Receipts and Cold-Storage Holdings of Fishery Products at Principal Distribution Centers 69
  - Chart 5 - Fish Meal and Oil Production - U. S. and Alaska ... 69
  - Chart 6 - Canned Packs of Selected Fishery Products 70
  - Chart 7 - U. S. Fishery Products Imports ... 71
- RECENT FISHERY PUBLICATIONS: ... 72
  - Fish and Wildlife Service Publications ... 72
  - Miscellaneous Publications ... 73

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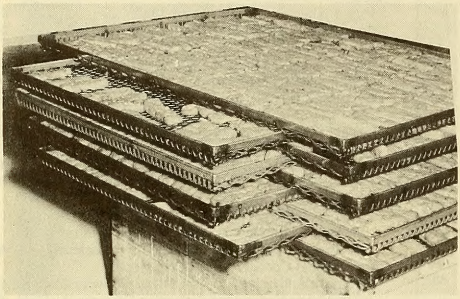
REPORT ON SURVEY OF BREADED FISHERY PRODUCTS RELEASED

"There is still plenty of room for further expansion of the fish-stick business, with roughly 60 percent of American households representing the size of the untapped market." Quoted from a report (Fishery Leaflet 424, Household Consumer Preferences for Breaded Shrimp and Breaded Fish Sticks) released in August by the U. S. Fish and Wildlife Service, this is one of the conclusions which has resulted from a nationwide survey of household consumer preferences for breaded shrimp and breaded fish sticks. This report is the first of a series of three analyzing the data collected.

The survey was made by National Family Opinion, Inc., of Toledo, Ohio, in November 1954, under the Service's direction, to provide the fishing industry with a basis for examination of the marketing prospects for breaded shrimp and fish sticks.

These recently-developed fishery products have made spectacular sales advances. Fish stick production jumped from 7.5 million pounds in 1953 to about 50 million pounds in 1954. The first half of 1955 was well ahead of the same period last year. Breaded shrimp production, which started in a small way after World War II, rose very rapidly and currently appears to have leveled off in 1954 at about 17 million pounds annually.


Trays of cooked fish sticks in Gloucester, Mass., plant ready for the packing table.

Lacking information on family use, the industry has been unable to determine if these favorable developments are based on permanent and perhaps expanding markets for fish sticks and shrimp. For the same reason the significance of the phenomenal sales of these products in relation to the market for other fish products could not be evaluated.

The survey represents the tabulated results from a questionnaire mailed out to 2,000 persons, predominately housewives, and returned by 1,797. The households selected were considered to be representative of all American households.

A summary of the data produces these facts:

1. Fish sticks are used in less than 40 percent of all American households.
2. Only about one homemaker in five uses breaded shrimp.
3. A high percentage of all homemakers trying either cooked or uncooked breaded shrimp become satisfied customers.
4. The prospects for expanding the market are favorable.
5. Most consumers are indifferent about the variety of fish used in making fish sticks.
6. Breaded shrimp and fish sticks completely replace other fishery products in only a very few households. A greater number but still a minority of the households replying, indicated partial replacement of other fishery products.
7. Consumers are well satisfied with present labeling.
8. There is a marked preference for the 12-ounce breaded shrimp package. A package of the same size is not generally available for fish sticks although there appears to be a considerable demand for it.

Free copies of this report, Fishery Leaflet 424, Household Consumer Preferences for Breaded Shrimp and Breaded Fish Sticks, are available from the Division of Information, U. S. Fish & Wildlife Service, Washington 25, D. C. This report summarizes the information obtained from the survey on a national and regional basis only.

Two additional fishery leaflets, now in preparation, will summarize the data analyzed in several other ways. Fishery Leaflet 425 will present an analysis of the replies, with respondents classified by farm and nonfarm groups, by rural groups, and by cities of various sizes. Fishery Leaflet 426 will analyze the replies by classifying the respondents as to the various ages of the homemaker, the size of the family, the occupation of the head of the household, and the family income group.